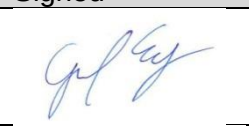
REVIEW OF ENVIRONMENTAL FACTORS (REF)
BURRIER PUMP STATION
PONDAGE REMEDIATION
SHOALHAVEN RIVER AT BURRIER / ILLAROO

Contents

Document control

Item	Details
Project	Remediation of Burrier Pumping Station Pondage
Client/Proponent	Shoalhaven Water - Shoalhaven City Council
Prepared By	Technical Services Department - City Services - Shoalhaven City Council

Document status

Version	Author / Reviewer*	Name	Signed	Date
V1.0	Author	Geoff Young		30/04/2025
	Review	Jeff Bryant		06/05/2025

*Review and endorsement statement:

"I certify that I have reviewed and endorsed the contents of this REF document and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation, and the information it contains is neither false nor misleading".

Assessment and approvals overview

Item	Details
Assessment type	Division 5.1 (EP&A Act) - Review of Environmental Factors (REF)
Proponent	Shoalhaven City Council – City Services
Determining authority / authorities	Shoalhaven City Council – City Services
Required approvals (consents, licences and permits)	Yes - "Crown Land Licence" – Section 5.21 of the *Crown Land Management Act 2016* "Fisheries Permit" – Section 219 of the *Fisheries Management Act 1994*
Required publication	Yes – Required by Section 171(4)(b)(i) of the NSW *Environmental Planning and Assessment Regulation 2021*

1. BACKGROUND AND PURPOSE

1.1 Overview

The Burrier Pumping Station Pondage is a critical component of Shoalhaven City Council's (SCC) water supply. Water from the pondage is pumped to Bamarang Dam where it is treated and distributed throughout most of the Local Government Area (LGA).

The Shoalhaven River at the site of the proposed activity is managed through the Greater Metropolitan Region Unregulated River Water Sources Water Sharing Plan 2023 (https://legislation.nsw.gov.au/file/2023-329%2020241004.pdf) and is within the Lower Shoalhaven River Catchment Water Source. Under this water sharing plan and Shoalhaven Water's local water utility licence, Shoalhaven Water can extract water from the river when flows are above 90ML/day. When the river flow drops below 90ML/day, Shoalhaven Water can request a release from Tallowa Dam (Water NSW) or release water from Danjera Dam.

The problem that the proposed activity seeks to address is that as a result of changes to the river channel, once flows drop below 160ML/day, the pondage around the pump station intakes drops to levels that Shoalhaven Water are unable to pump and refill the off-stream storage (Bamarang Dam) for treatment and distribution.

The pondage, comprising a natural shingle bar and man-made rock weir, was damaged by the 2019/2020 catchment-wide bushfires and subsequent flood events which caused breaches in both the shingle bar and weir. The breach in the shingle bar has created and established a low-flow "northern channel" with which water bypasses the pondage located within the "southern channel" (Figure 2 p.9). Breaches in the weir have reduced the capacity of the pondage. As the pondage becomes too low to pump from during low flow periods (160ML/day), these breaches have, and will continue to, significantly impact Shoalhaven's water supply.

The proposed activity is the remediation of the pondage which would include installation of a training wall at the shingle bar breach using rock bags and salvaged logs, and remediation of the weir by reinstating rock material.

Works would also involve the implementation of safeguards and mitigation measures prescribed in Section 7 of this Review of Environmental Factors (REF).

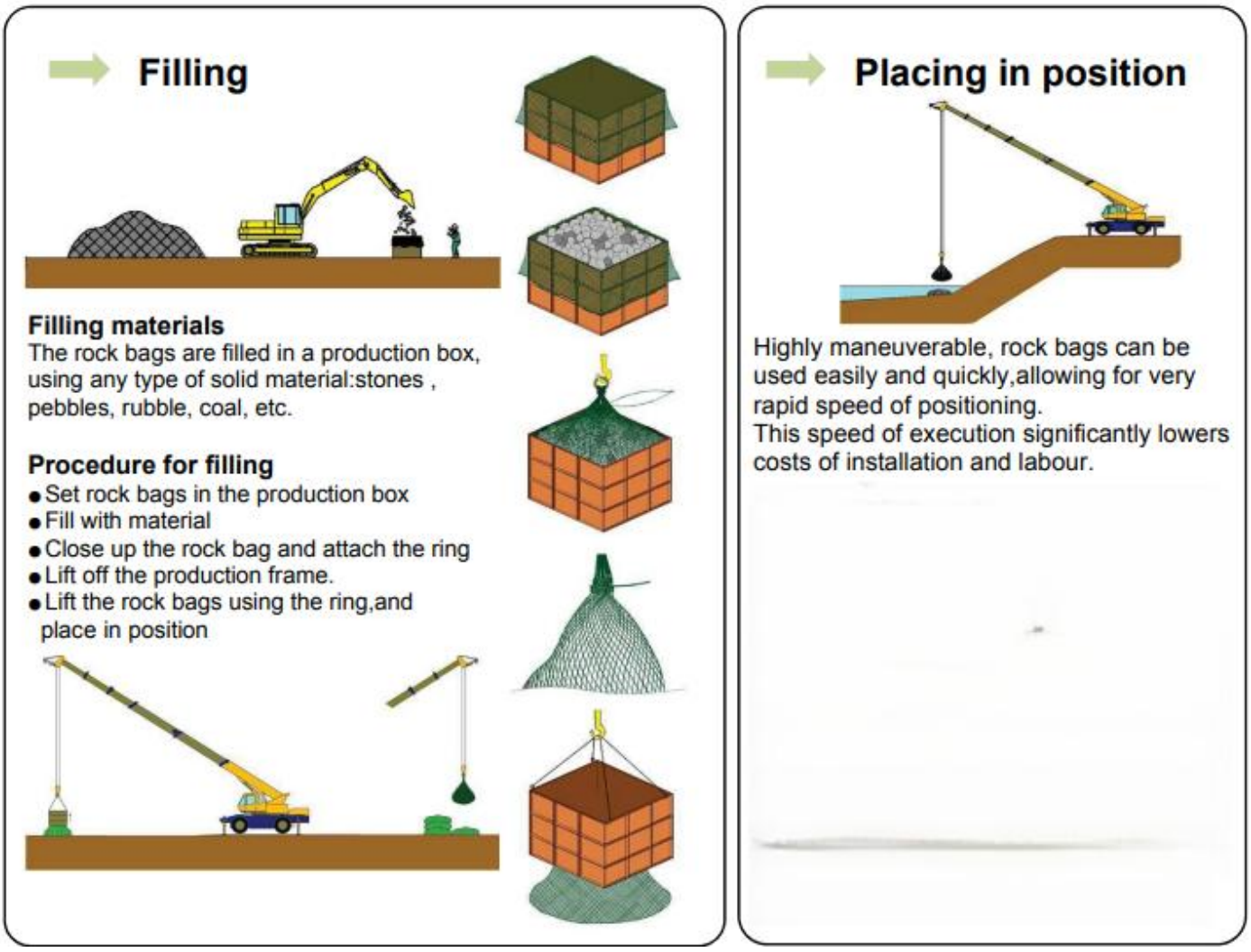
Shoalhaven City Council (SCC) is the proponent and the determining authority under Part 5 of the EP&A Act. The environmental assessment of the proposed activity and associated environmental impacts has been undertaken in the context of Clause 171 of the *Environmental Planning and Assessment Regulation 2021*. In doing so, this REF helps to fulfil the requirements of Section 5.5 of the Act that SCC examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

1.2 Proposed Activity

The installation of a 'training wall' utilising Ecogreen Rock Bags is proposed. Rock bags are made of recycled polyester, which is non-corrosive, and rot and weather resistant. Flexibility of the polyester fibres makes rock bags adaptable to all reliefs. The structure of the mesh allows the

bags to be highly resistant to impacts and pressure and should be able to withstand the currents experienced at the site (refer to Appendix A for more information).

A medium sized excavator shall be utilised to fill and place the rock bags. The rock bags are filled with natural rock, shingles and cobbles on the shingle bar in a 'production box' (refer to Figure 2, Figure 3 and Section 2.5 below). Once filled, the bags are closed off and lifting ring is attached. The bag is then lifted by the excavator and placed into position.



The rock bags utilised at the site would be Ecogreen 4 tonne bags with a mesh size of 25 mm and when filled have a height of 0.6 m, a diameter of 2.4 m, and a volume of 2.5m^3. The purported resistance to currents without being moved is 5.3m/s which should be adequate for the site.

Two rows of bags would be placed across the northern channel. A third row would be placed on top of the base row. The rock bag layers would be embellished with tree logs that project in towards the southern channel to catch debris, sediments and shingles/cobbles (Figure 3 below). These logs would be sourced from the shingle bar. Only logs from dead trees which are not currently embedded in the substrate would be used for this purpose.

The rock bags would utilise shingles extracted nearby but away from the shoreline (*i.e*. in the middle of the shingle bar), with a minimum 10m buffer to water for both excavation and filling of

rock-bags, to reduce the risk of further destabilisation of the shingle bar and to avoid disturbance of fine materials in the waterway. The rock bag layer would be positioned approximately 1 metre offset from the existing shingle bar shoreline, inside the northern channel to facilitate natural build-up of material along the shoreline.

Once it has been determined that the rock bags are effective and stable, a slow progressive remediation of the weir to restore to a previous height (but lower than the height of the rock bags) would then occur. This will involve the replacement of rocks along the weir using an excavator ensuring fish passage is maintained as far as practical *i.e.* avoiding vertical barriers greater than 100mm in height, avoiding concentrated areas of velocity, and having a 1:20 grade below the repaired section.

1.3 Location

The proposed activity would be undertaken predominantly within the Shoalhaven River. Minor components of the proposed activity would also extend into adjoining lands shown in Figure 2 and described in Table 1 below.

Table 1: Lands affected by the proposed activity

Land details	Components of activity	Pertinent land information
Shoalhaven River	Installation of training wall. Extraction of materials for the wall. Remediation of the weir. Conveyance of plant and machinery (*e.g.* excavator).	• Crown Land. • Key Fish Habitat for the purposes of the NSW *Fisheries Management Act 1994.*
Lot 100 DP884477 400 Hughes Road And Lot 50 DP755916 Burrier Road	Conveyance of plant and machinery to the weir and shingle bar.	• Private Land. • Consent to enter shall be obtained.
Lot 7311 DP1129118	Conveyance of plant and machinery to the weir.	• Crown Land Reserve (R1011448) – reserved for “Future Public Requirements” – gazetted 29/06/2007. • Subject of an undetermined Aboriginal Land Rights Claim.

Figure 1 Location of the proposed activity

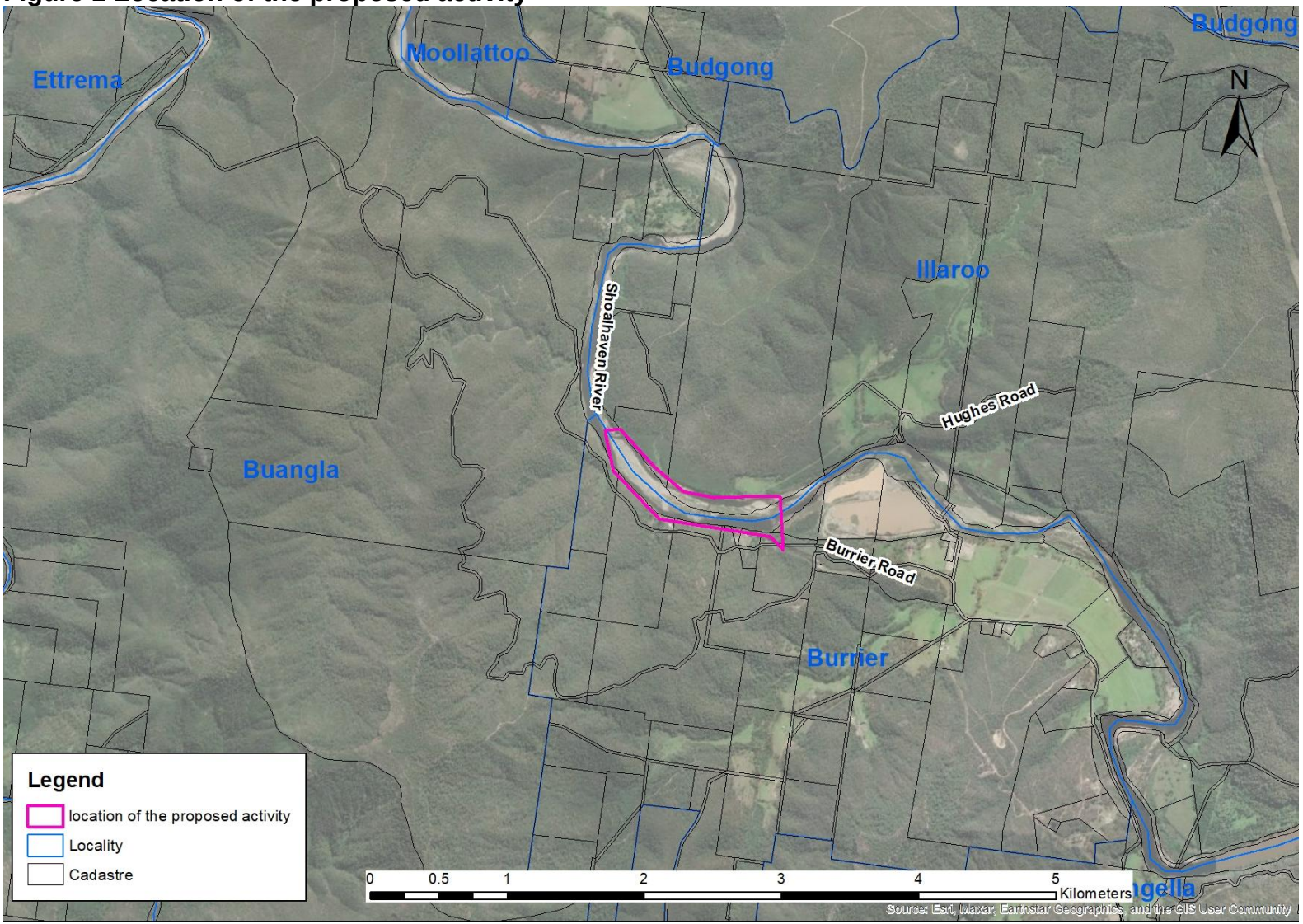


Figure 2 The proposed activity

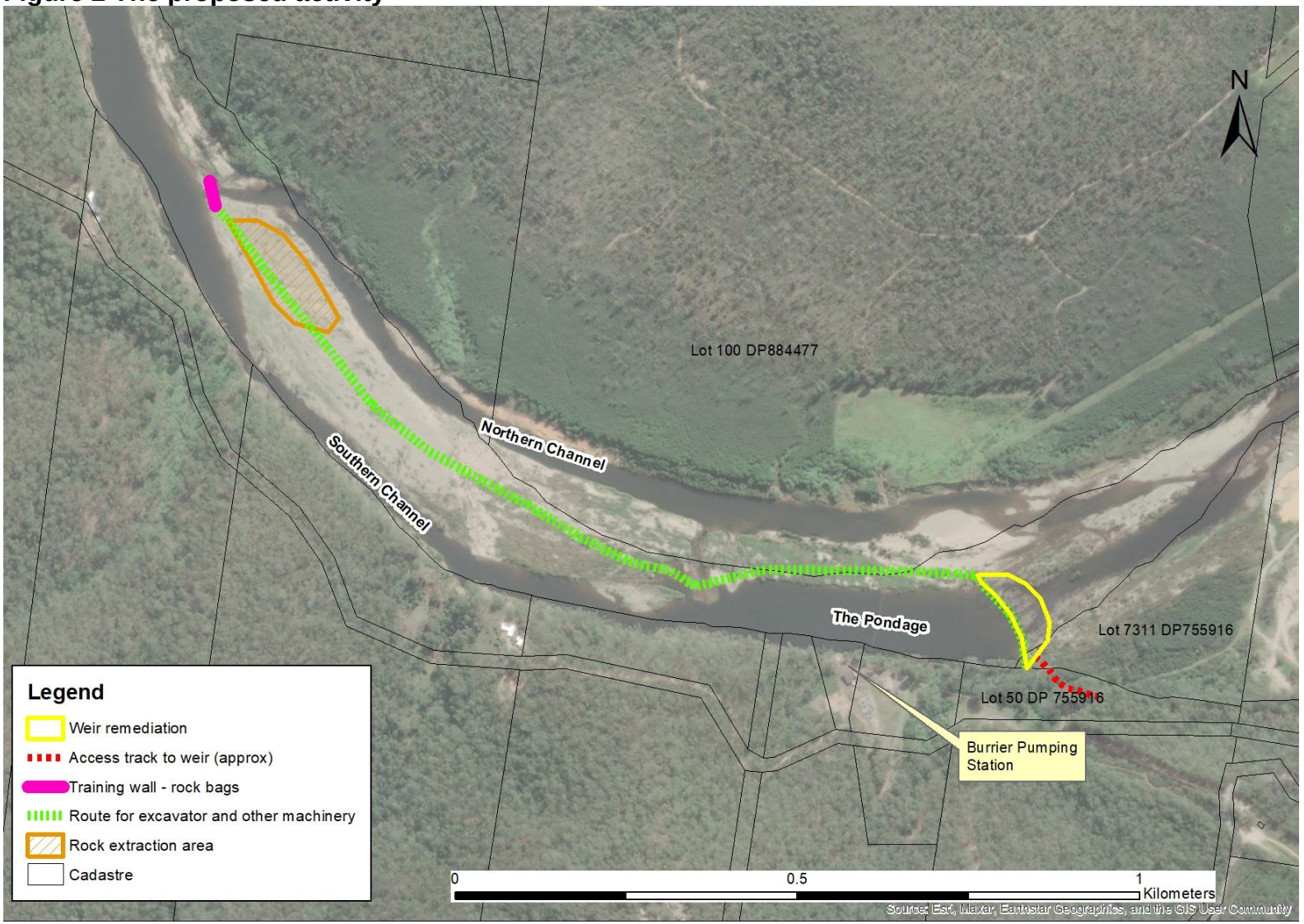


Figure 3 The Training Wall works

2. Site Description

The proposed activity would be undertaken almost entirely in the Shoalhaven River and the shingle bar.

The site was assessed by a Council Environmental Officer on 14 April 2025. Investigations involved vegetation and habitat assessment, recording flora species within and immediately adjacent to the area that would be impacted by the proposed activity, determination of vegetation communities, targeted survey for potentially occurring threatened flora species (including Nowra Heath Myrtle *Triplarina nowraensis,* Deane's Paperbark *Melaleuca deanei,* Square Raspwort *Haloragis exalata subsp. exalata,* Cotoneaster Pomaderris *Pomaderris cotoneaster* and *Solanum celatum*) and investigation of habitat availability on site for threatened fauna species and cryptic threatened flora species.

Photos of the site are provided in Section 2.5 below.

2.1 The Pondage

The Pumping Station was designed and constructed in the early 1960s. It is assumed that the weir for the pondage was constructed simultaneously. Figure 4 below shows the presence of the weir in 1969.

Weir design plans cannot be located. However, it appears to have been constructed with imported quarried rock and concrete blocks (~600mm) and local rocks loosely placed across the river.

Height of the weir in 1994 is shown in Figure 5 below. The remediation of the weir would be to restore the height commensurate with the weir at this time.

Figure 4 The Pondage and Weir *circ. 1969*

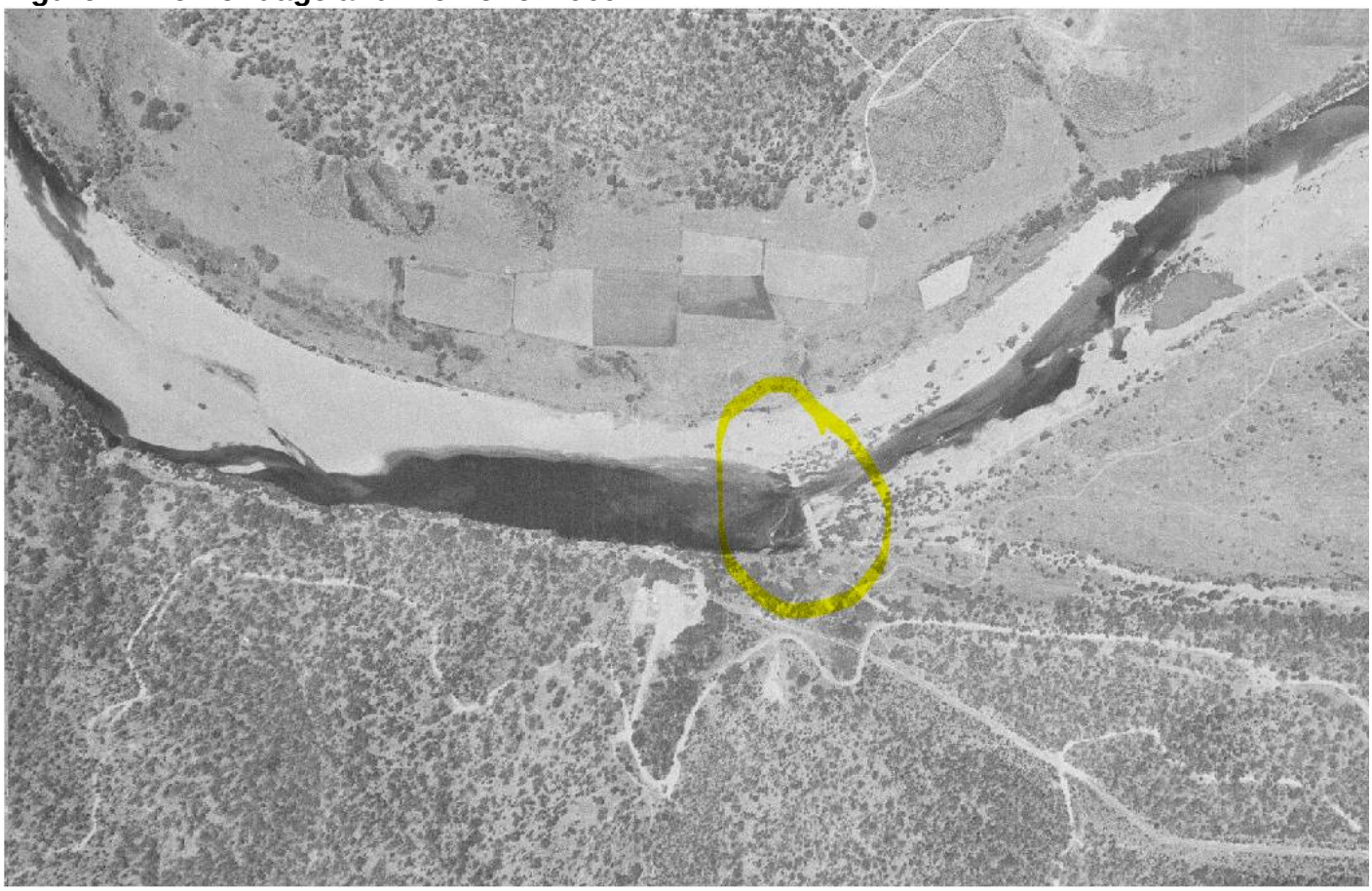
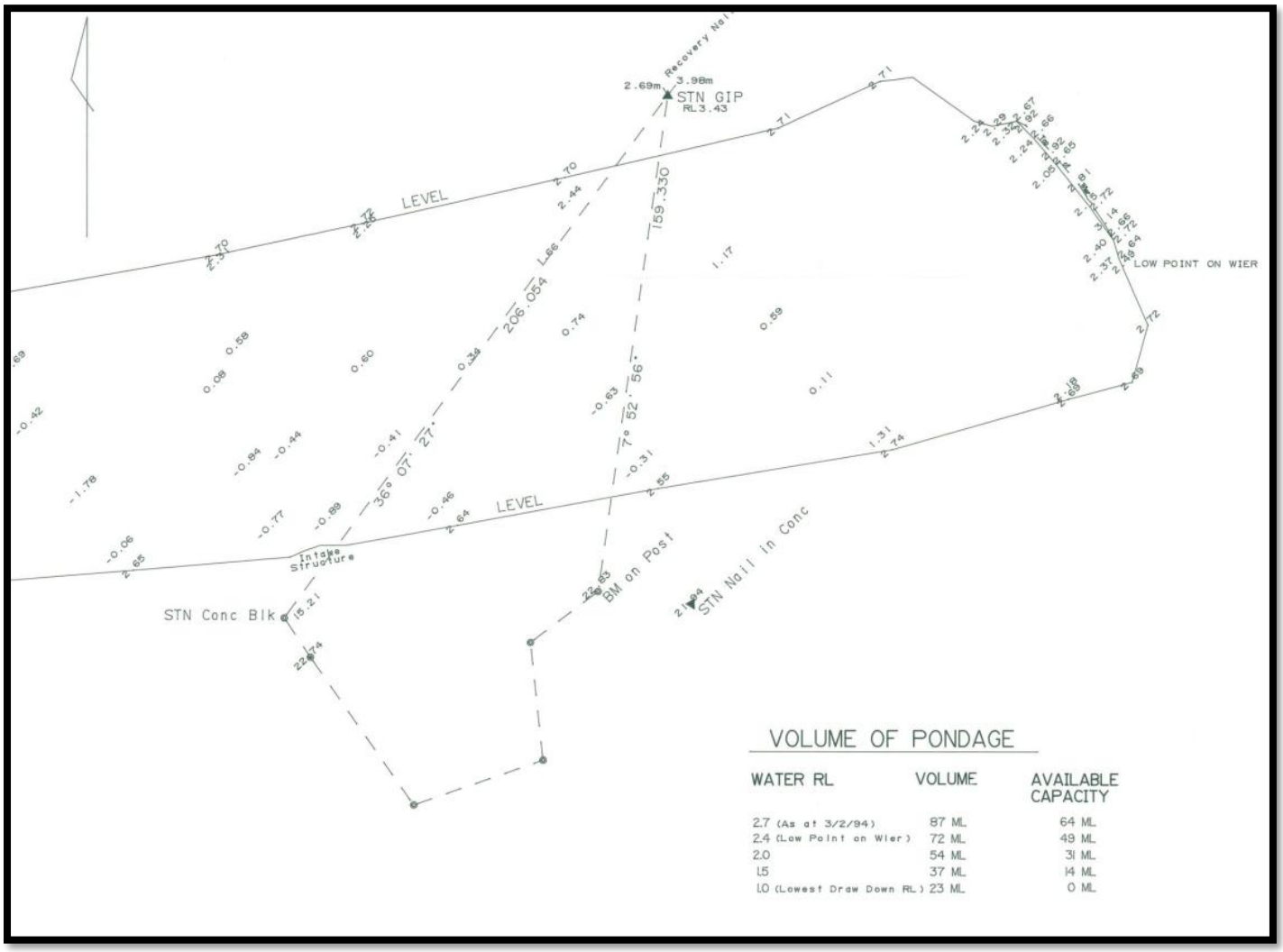


Figure 5 The Pondage and Weir survey 1994



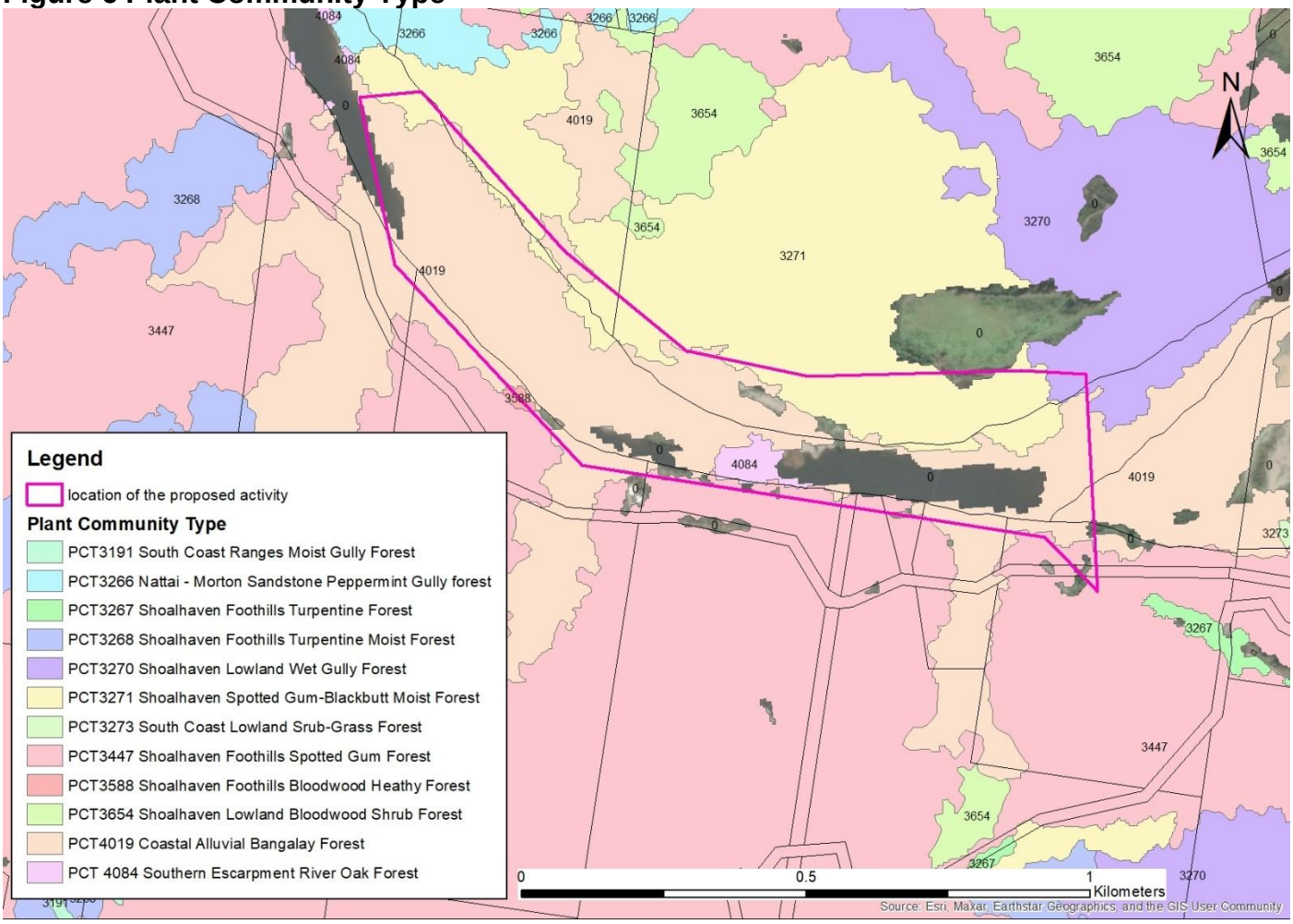
2.2 Terrestrial Habitat and Features

Vegetation mapped as occurring in proximity to the site (refer to Figure 6 below) includes:

- PCT4019 *Coastal Alluvial Bangalay Forest.* This vegetation community is associated with *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* Endangered Ecological Community (EEC, NSW *Biodiversity Conservation Act 2016)* and *River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* EEC (Commonwealth *Environment Protection and Biodiversity Conservation Act 1999)*.
- PCT4084 *Southern Escarpment River Oak Forest.* This vegetation community is not associated with any EEC.
- PCT3447 *Shoalhaven Foothills Spotted Gum Forest*. This vegetation community is not associated with any EEC.
- PCT3271 *Shoalhaven Spotted Gum – Blackbutt Moist Forest*. This vegetation community is not associated with any EEC.

Vegetation within the footprint of the proposed activity primarily consists of exotic, weedy plants including Stinking Roger *Tagetes minuta*, Kikuyu *Cenchrus clandestinus*, Umbrella Sedge *Cyperus eragrostis*, Cobblers Pegs *Bidens pilosa*, Sow Thistle Sonchus spp, Fleabane *Conyza spp*, Paspalum *Paspalum dilatatum* Couch *Cynodon dactylon,* Purpletop *Verbena bonariensis,* Castor Oil Plant *Ricinus communis*, Cockleburr *Xanthium spp.* and Knotweed *Persicaria spp*. Native species are present as River Sheoak *Casuarina cunninghamiana,* Swamp Oak *Casuarina glauca,* Grey Myrtle *Backhousia myrtifolia,* Rough-fruited Pittosporum *Pittosporum revolutum,* Hop bush *Dodonea triquetra,* Native Peach *Trema tomentosa var aspera,* Black Wattle *Acacia mearnsii,* Two-veined Hickory *A. binervata,* Sallow Wattle *A. floribunda,* Slender Wattle *A. elongata,* and *Lomandra longifolia.* This is more representative of PCT4084 *Southern Escarpment River Oak Forest* rather than the other PCTs listed above and mapped in Figure 6 below.

Figure 6 Plant Community Type



2.3 The Waterway

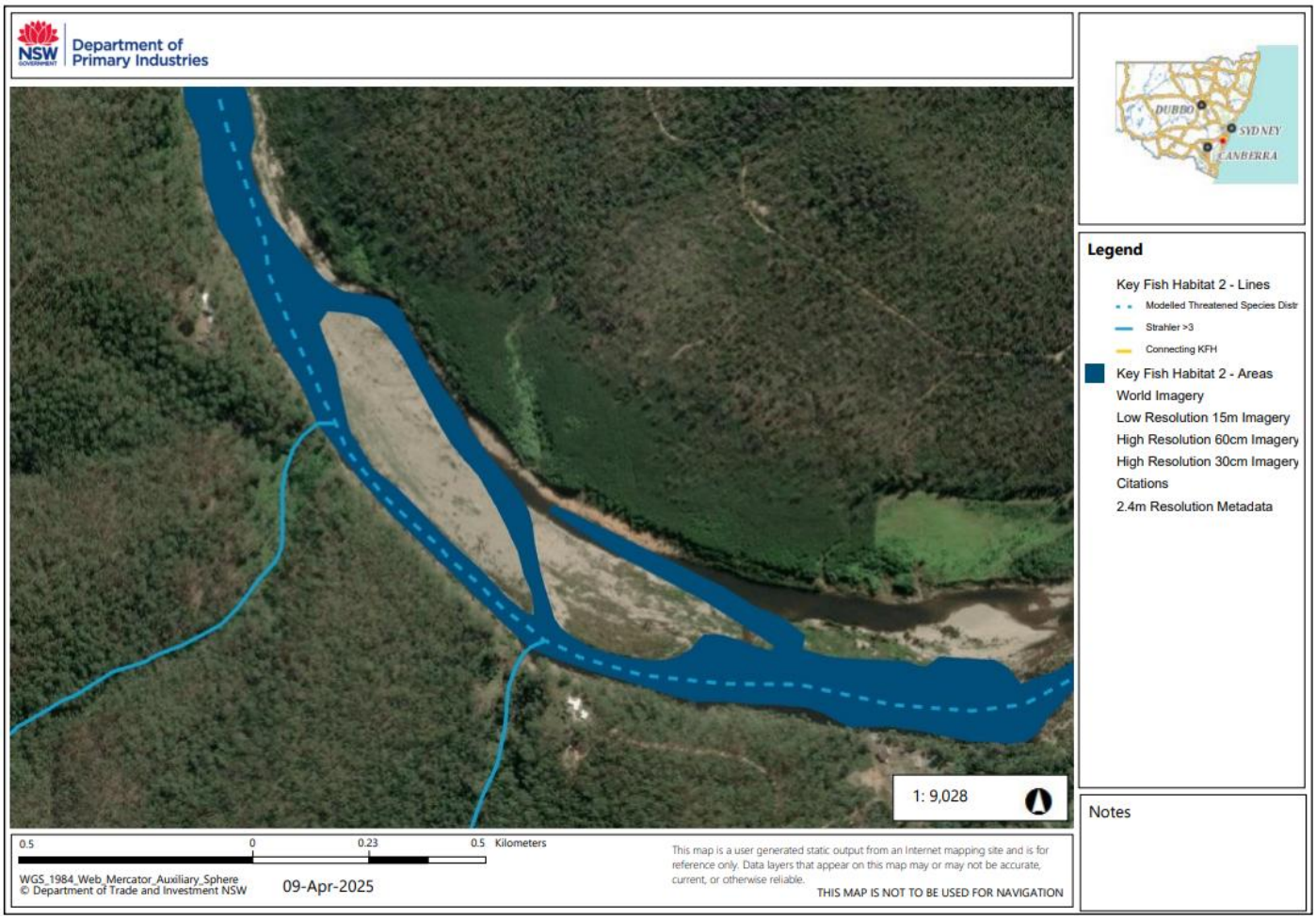
The Shoalhaven River catchment has an area of 7,300 km^2 and a length of 300 kms. Below the Mongarlowe River confluence, approximately 30 km north of Braidwood, the river flows through 300 to 500 m deep gorges of Morton National Park. Here the Corang and Endrick Rivers, two large tributaries, enter the river. At the eastern end of these gorges, the river enters Lake Yarrunga / Tallowa Dam. Here the River is joined from the north by Kangaroo River, and turns east to its

estuarine mouth, 10 kilometres north-east of Nowra. Below Tallowa Dam, the river continues through confined valleys for approximately 20 kilometres, where it enters estuarine floodplain at the tidal prism just downstream of the Burrier Pumping Station.

The Shoalhaven River is mapped as “key fish habitat” for the purposes of the NSW *Fisheries Management Act 1994* (Figure 7 below). The river at the site of the proposed activity would be regarded as a “Class 1 – Major Key Fish Habitat” and “Type 1 – Highly Sensitive” under the NSW *Policy and Guidelines for Fish Habitat and Management* (DoPI 2013). Fish that are likely to be present are Australian Bass *Percalates novemaculeata*, Australian Smelt *Retropinna semoni,* Short-finned Eel *Anguilla asuralis,* Long-finned Eel *A. reinhardtii,* Common Jollytail *Galaxias maculatus,* Freshwater Mullet *Trachystoma petardi* and Black Bream *Acanthopagrus butcheri.*

The Shoalhaven River at the site of the proposed activity is also mapped by the NSW Department of Primary Industries as “Indicative distribution” for the Australian Grayling *Prototroctes maraena,* a species listed in the threatened species schedules of the NSW *Fisheries Management Act 1994.* The Australian Grayling was once known from the Shoalhaven River and the river is identified in the National Recovery Plan as and ‘Important River’ for the species (Backhouse *et al.* 2008). The species however has not been recently detected in the river and a 2024 eDNA survey of the river did not detect the species (Australian Grayling | Department of Primary Industries). Despite this, an assessment of impact to this species by this proposed activity is provided in Section 3.4.1 of this REF.

Figure 7 Key Fish Habitat (DoPI 2025) map



2.4 Geology and Geomorphology

The site of the proposed activity is comprised of alluvial valley deposits of silt, clay, fluvially deposited lithic to quartz-lithic sand, and gravels over Wandrawandian Formation (most likely siltstone). Acid Sulfate Soils and Potential Acid Sulfate Soils are unlikely.

2.5 Photos

Photo 1: Burrier Pumping Station and associated pondage

Photo 2: One breach of the weir (photo taken downstream of the weir)

Photo 3: Another breach of the weir

Photo 4: Possible original blocks used to create the weir

Photo 5: Breach of the shingle bar allowing low flow waters into the northern channel bypassing the pumping station pondage

Photo 6: Northern channel fed by the shingle bar breach

Photo 7: Naturally deposited shingles to be used to fill the training wall rock bags.

Photo 8: The excavator would travel over the western part of the shingle bar to get to the training wall site – predominantly bare of vegetation.

Photo 9: The excavator would also travel over the eastern part of the shingle bar dominated by exotic weed plants such as Kikuyu and Stinking Roger

3. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

3.1 Impacts associated with the proposed activity

The proposal would involve the following disturbances and direct impacts:

- Impact (excavator travelling over) to approximately 2,880 m^2 of predominantly exotic weed vegetation.
- Obstruction to fish passage.

Other impacts on the environment, including indirect impacts have been considered, including:

- heritage and
- threatened species.

Each is discussed below.

3.2 Vegetation Impact

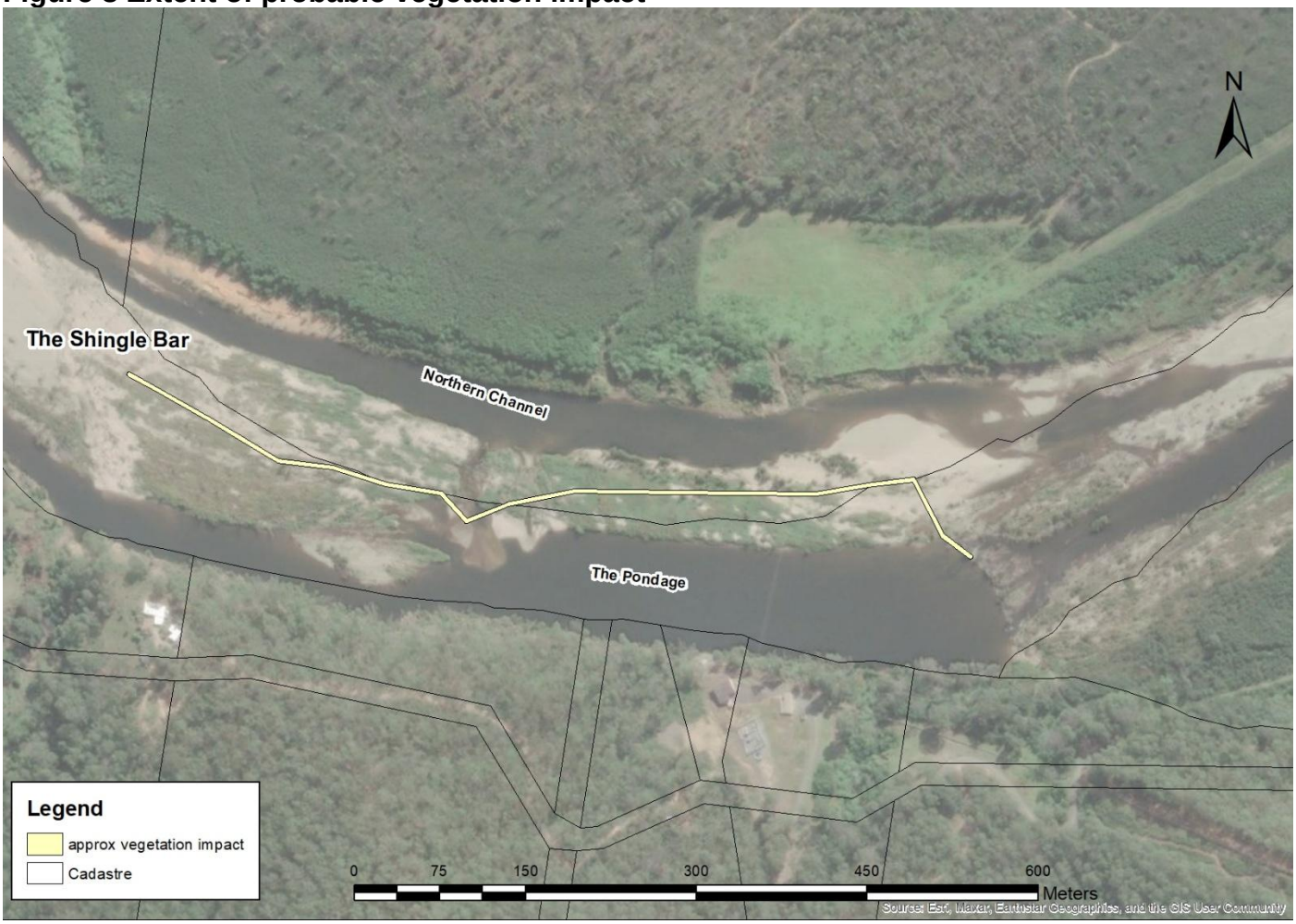
The proposed activity would involve the impact to approximately 2,880m^2 of predominantly non-native weedy species (Figure 8 below). A description of the vegetation is provided in Section 2.1 of this REF.

The removal of the vegetation is not considered a significant impact for the following reasons:

- The impact is only temporary consisting of an excavator rolling over predominantly kikuyu swathes with non-native species. The vegetation is anticipated to recover quickly.
- The native species that may be impacted (*e.g.* River Sheoak, Black Wattle, Hop Bush) are common and are not on the threatened species schedules of the NSW *Biodiversity Conservation Act 2016* or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*
- The excavator would be escorted by a Council Environmental Officer to limit impact to native trees species. No mature trees would be impacted.
- The vegetation that may be impacted do not contain hollows which could provide breeding or roosting habitat.
- The vegetation is unlikely to have a significant impact on Threatened Ecological Communities. Refer to Section 3.4.2 of this REF for details.

Environmental impact mitigation measures and safeguards listed in Section 7 of this REF do, however, apply to limit impact to native vegetation and vegetation disturbance.

Figure 8 Extent of probable vegetation impact



3.3 Obstruction / Blockage to Fish Passage

The proposed activity would involve obstruction to fish passage (weir remediation and northern channel training wall).

Fish passage is critical to the survival of Australian native fish. Species move within waters to access food and shelter, avoid predators, breed and recruit into new habitats. Blockage to fish passage has been identified as a Key Threatening Process under the NSW *Fisheries Management Act 1994.*

Barriers to fish passage can effectively stop many fish species from breeding and re-populating waterways by restricting their ability to access breeding partners and areas. Fish attempting to negotiate barriers are forced to use up energy reserves. If this occurs during a breeding event, fish may reabsorb their eggs and sperm to replenish their energy reserves, effectively losing a breeding season with possible long-term flow on effects to the size and sustainability of the population (Faithfull and Witheridge 2003). Some barriers, such as weirs, can also create still-water pools that provide excellent habitat for pest species to proliferate and outcompete native species for food and shelter (Faithfull and Witheridge 2003).

The Australian Grayling *Protoctoctes maraena,* a NSW State and Commonwealth listed threatened species, is known to have once occurred in Shoalhaven River. This species is migratory with young migrating out to sea for the first 4 to 6 months before returning to freshwater. Barriers to movement is identified as one of the reasons for the decline of the species (refer to Section 3.4.1 of this REF for more information).

The *Policy and Gudelines for Fish Habitat Conservation and Management* (DoPI 2013) provides the following guidelines for works involving obstruction to fish passage:

- *"The timing of any works should be planned so as to not to interfere with the possible migration of fish within the waterway. Temporary blockages should not be placed within a waterway during the months of September to March, which are the key months of native fish are moving to spawn or recruit within NSW waters.*
- *The timing of works should coincide with low flow periods within the respective catchment.*
- *In-stream works should be designed and staged to avoid blocking the entire waterway. If the entire waterway is to be blocked, measures need to be implemented to maintain historic base flow conditions within the waterway (e.g. diversion channel) for the duration of the proposed works.*

Existing obstructions to fish passage are present as the existing weir (in place since the early 1960s) and more significantly the Tallowa and Danjera Dams upstream of the site. The shingle bar would have acted as an obstruction during low flow events with the northern channel flowing during high flow periods. Several tributaries up and down stream of the proposed activity site are also obstructed by fords (Grassy Gully Road / Grassy Gully Creek), culverts (Burrier Road / Barringella Creek) and numerous bridge structures along Burrier Road.

The proposed activity is not considered a significant impact and therefore not requiring an Environmental Impact Statement (EIS) for the following reasons:

- The remediation of the weir involves the remediation of existing weir that has likely to have been in place since the early 1960's.
- Works would avoid the critical migration period of the Australian Grayling (middle of October to middle of January).
- Works would avoid the key months of native fish spawning movement as per the *Policy and Guidelines for Fish habitat Conservation and Management* (DoPI 2013) *i.e.* September to March.
- The height of the northern training wall would match the height of the existing natural shingle bar and thereby allow passage during higher flows similarly to pre-damage conditions.

The remediation of the weir would also be conducted as per requirements of DoPI Fisheries staff (refer to Section 5.2 of this REF) *i.e.:*1:20 grade on the repaired section of the weir and avoiding vertical drops greater than 100mm in height and concentrated areas of velocity. This has been

achieved in other areas of less damaged sections of the weir as shown in Photos 10 and 11 below.

All measures have been reflected in the environmental impact mitigation measures and safeguards prescribed in Section 7 of this REF.

Photo 10: Example of existing weir exhibiting 1:20 grade and avoiding vertical drops greater than 100mm in height and concentrated areas of velocity

Photo 11: Example of existing weir exhibiting 1:20 grade and avoiding vertical drops greater than 100mm in height and concentrated areas of velocity

3.4 Threatened species impact assessment (NSW)

Section 1.7 of the EP&A Act 1979 applies the provisions of Part 7 of the NSW *Biodiversity Conservation Act 2016* and Part 7A of the *NSW Fisheries Management Act 1994* that relate to the operation of the Act in connection with the terrestrial and aquatic environment. Each are addressed below.

3.4.1 Part 7A *Fisheries Management Act 1994*

Part 7A relates to threatened species conservation. Section 221ZV of the Act provides a 'seven-part' test to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. Each Part is addressed below.

Part 1 In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is to be placed at risk of extinction.

The Australian Grayling *Proctotroctes maraena* has historically been known to occur in the Shoalhaven River with the Shoalhaven River listed as an 'Important River' in the National Recovery Plan (Backhouse *et al.* 2008). The Shoalhaven River at the proposed activity site is also

mapped by NSW Department of Primary Industries (DoPI 2016) as "*Indicative distribution of the Australian Grayling"* (Figure 9 below).

The Australian Grayling is a small to medium-sized slender fish that is endemic to south-eastern Australia. It is a migratory species that spawns in the lower freshwaters or coastal rivers and spends approximately six months in coastal areas as larvae/juveniles before migrating back into freshwater rivers and streams where they remain for the rest of their lives (DoPI 2015).

The species was once abundant throughout its range, but it has declined in areas since European settlement of Australia and is now generally patchily distributed. Likely factors of the species decline include barriers to migration (such as dams and weirs), changes to rivers including altered flow and temperature regimes, and increased nutrient and sediment loads. All listed factors of decline are present in the Shoalhaven River particularly the regulation and barriers posed by Tallowa and Danjera Dams and the siltation impact of catchment-wide bushfires.

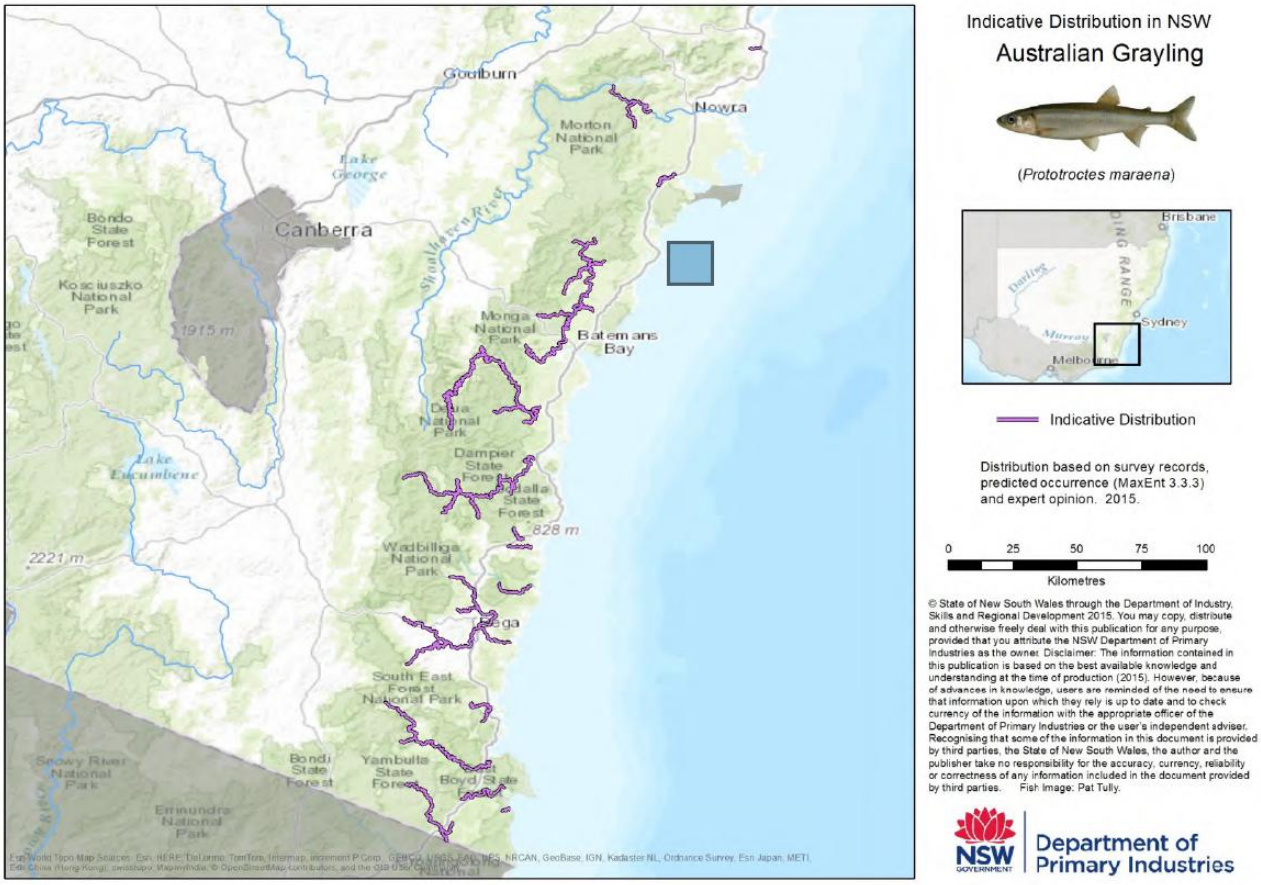
There are some key times and locations when works should not be occurring, this is at spawning / recruitment times, particularly at the tidal influence such as the location of the proposed activity (Ganassin *pers.comm.* 2022). Instream works should be avoided from the middle of October to the middle of January (Ganassin *pers.comm.* 2022).

Although the species has historically been known to occur within the Shoalhaven River and the proposed activity is just upstream of the tidal prism, the proposed activity is unlikely to have an adverse effect on the life cycle of the species such that a viable local population of the species is to be placed at risk of extinction for the following reasons:

- The species has not been recently detected in the Shoalhaven River and a 2024 eDNA survey did not detect the species in the river. A viable population may not be present.
- Works would be undertaken outside the critical months of October through to February.
- The training wall would not exceed the height of the adjacent shingle bar thereby allowing for passage of the species during high flow events.
- The remediation of the weir would be conducted to allow for continued fish passage over the weir *i.e.:*1:20 grade on the repaired section of the weir and avoiding vertical drops greater than 100mm in height and concentrated areas of velocity.

A species impact statement (SIS) or an EIS is therefore not required.

Figure 9 Indicative distribution of Australian Grayling (DoPI 2016)



Part 2 In the case of an endangered population, whether the proposed development or activity is likely to have an adverse effect on the lifecycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

The endangered populations listed under the Act are:

- *Ambassis agassizii* Steindachner Agassiz's glassfish, olive perchlet, western New South Wales population
- *Craterocephalus amniculus* Darling River Hardyhead, Hunter River population
- *Gadopsis marmoratus* river blackfish, Snowy River population
- *Tandanus tandanus* freshwater catfish, eel tailed catfish, Murray-Darling Basin population
- *Posidonia australis* seagrass, Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie populations

These areas would be unaffected by the proposed works in the Shoalhaven River.

Part 3 In the case of an endangered ecological community or critically endangered ecological community whether the proposed development or activity:

I. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

II. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The endangered ecological communities listed under the Act are:

- Aquatic ecological community in the natural drainage system of the lower Murray River catchment
- Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River
- Aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River
- Aquatic ecological community in the catchment of the Snowy River in NSW

These areas would be unaffected by the proposed works in Shoalhaven River.

Part 4 In relation to the habitat of a threatened species or ecological community:

I. The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

II. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

III. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

No important habitat for threatened species would be removed or otherwise significantly impacted (see Part 1).

No threatened ecological community (TEC) would not be fragmented or isolated, nor removed or modified to an extent that would affect the long-term survival of the TEC occurring in the locality (refer to Part 3).

The proposal will therefore not affect the long-term survival of any threatened species or endangered ecological community in the locality. A SIS is therefore not required.

Part 5 Whether the proposed development or activity is likely to have an adverse effect on any critical habitat (either directly or indirectly),

The only critical habitat currently on the register is "*Critical Habitat of Grey Nurse Shark"* (*http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0003/636330/Grey-nurse-shark-critical-habitat.pdf*) with listed and mapped areas of:

- Bass Point (Shellharbour)
- Big and Little Seal Rocks
- Fish Rock and Green Island (South West Rocks)
- Julian Rocks (Byron Bay)
- Little Broughton Island (Port Stephens)
- Magic Point (Maroubra)
- Montague Island (Narooma)
- The Pinnacle (Forster)
- Tollgate Islands (Batemans Bay)

These areas would be unaffected by the proposed works in Shoalhaven River.

Part 6 Whether the proposed development or activity is consistent with a Priorities Action Statement

A Draft Priority Action Statements (PAS) has been prepared for the Australian Grayling. As demonstrated in Part 1 above, the proposed activity would have no effect on this species. Similarly, the proposed activity is unlikely to be inconsistent with respective PAS as demonstrated below.

Action from PAS	Relevance / consistency
Collate existing data on distribution, abundance and population parameters.	Not relevant to the proposed activity. The proposed activity would not obstruct this action.
Enhance, modify or implement NRM planning processes to minimize adverse impacts on threatened species.	Not relevant to the proposed activity. The proposed activity would not obstruct this action.
Identify rivers where flow regulation or water abstraction potentially impacts on important populations and habitats of Australian Grayling, and ensure conservation requirements are included in river management processes.	The Shoalhaven River is regulated by Tallowa and Danjera Dams and is used for water extraction at the site of proposed activity. Although these structures may be impacting habitat they have been in-place for decades (1960s for the Burrier Pondage and 1976 for

Action from PAS	Relevance / consistency
	Tallowa Dam) and are considered critical infrastructure for the supply of potable water for Shoalhaven, Southern Highlands, Sydney and Illawarra. The Tallowa Dam Fish Lift is currently non-operational but is proposed to be reopened in 2026. This is being undertaken by WaterNSW. Steps are being undertaken for the proposed activity to limit the impact to the Grayling including (refer to Section 7): • Works would be undertaken outside the critical months of October through to February. • The remediation of the weir would be conducted to allow for continued fish passage over the weir *i.e.:*1:20 grade on the repaired section of the weir and avoiding vertical drops greater than 100mm in height and concentrated areas of velocity.
Protect and restore riparian habitat in catchments supporting Australian Grayling populations, with priority to those catchments supporting important habitat/populations.	Beyond the scope of the proposed activity and beyond the ability of Shoalhaven Water. The proposed activity would not obstruct this action.
Ensure Australian Grayling conservation requirements are included in fishway programs.	Beyond the scope of the proposed activity and beyond the control of Shoalhaven Water. The proposed activity would not obstruct this action.
Investigate the impact of trout on Australian Grayling.	Beyond the scope of the proposed activity and beyond the control of Shoalhaven Water. The proposed activity would not obstruct this action.
Ensure important populations and locations are protected from stocking of trout.	Beyond the scope of the proposed activity and beyond the control of

Action from PAS	Relevance / consistency
	Shoalhaven Water. The proposed activity would not obstruct this action.
Investigate larval and juvenile distribution, habitat and movements.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.
Undertake a genetic assessment of population structure throughout range.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.
Identify populations and locations for long-term monitoring, especially to determine population trends and responses in locations where recovery actions are occurring (eg. fishway installation, catchment protection).	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.
Investigate spawning cues, particularly the influence of river flows.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.
Investigate adult distribution, habitat and movements.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.
Investigate the potential for predation on larvae/juveniles in estuarine environments.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.
Investigate the impact of increased sedimentation on Australian Grayling and habitats in catchments affected by wildfires.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.
Determine gaps in distribution data and undertake surveys to determine presence and significance of grayling populations in areas poorly surveyed.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.

Action from PAS	Relevance / consistency
Identify and map important habitat (rivers/locations), particularly for recruitment and as potential drought refuge habitat.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.
Acquire baseline data on selected populations by conducting surveys including (a) identification of the area and extent of populations; (b) estimates of the size and structure of populations; (c) inference or estimation of population change and (d) habitat quality.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.
Ensure research findings are publicised and incorporated into catchment management and river health programs where appropriate.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.
Promote angler awareness of conservation of Australian Grayling where incidental capture is likely to be an issue.	Beyond the scope of the proposed activity and beyond the faculty of Shoalhaven Water. The proposed activity would not obstruct this action.

Part 7 Whether the proposed development constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

Key Threatening Process	Assessment
Degradation of native riparian vegetation along NSW water courses	The proposal would not significantly affect riparian vegetation (refer to Section 3.2 of this REF).
Hook and line fishing in areas important for the survival on threatened fish species	Not applicable – proposal does not comprise or facilitate hook and line fishing.
Human-caused climate change	Not applicable – the proposal does not contribute to human-cause climate change.
Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams	The Shoalhaven River is regulated by Tallowa and Danjera Dams and is used for water extraction at the site of proposed activity. Although these structures may be altering natural flow regimes they have been in-place for decades (1960s for the Burrier Pondage and 1976 for Tallowa Dam) and are considered critical infrastructure for the

Key Threatening Process	Assessment
	supply of potable water for Shoalhaven, Southern Highlands, Sydney and Illawarra. The Tallowa Dam Fish Lift is currently non-operational but is proposed to be reopened in 2026. This is unrelated to the proposed activity and is being undertaken by WaterNSW. Shoalhaven Water has no management authority over Tallowa Dam. In comparison to Tallowa Dam the Burrier Pumping Station weir is a minor structure and would have a minor impact to flow regimes. Steps are also being undertaken for the proposed activity to limit the impact to the Grayling including (refer to Section 7): • Works would be undertaken outside the critical months of October through to February. • The remediation of the weir would be conducted to allow for continued fish passage over the weir *i.e.*: 1:20 grade on the repaired section of the weir and avoiding vertical drops greater than 100mm in height and concentrated areas of velocity. The impact of the proposed activity is therefore not considered significant.
Introduction of fish to waters within a river catchment outside their range	Not applicable – the proposal does not involve releasing fish.
Introduction of non-indigenous fish and marine vegetation to the coastal waters of NSW	Not applicable – the proposal does not involve the introduction of non-indigenous fish.
Removal of large woody debris from NSW rivers and streams	Not applicable – the proposal does not involve the removal of woody debris.
The current shark meshing program in NSW waters	Not applicable – the proposal does not involve shark meshing.

3.4.2 Part 7 Biodiversity *Conservation Act 2016*

Section 7.3 of the Act provides a 'five-part' test to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. Each Part is addressed below.

Part A - In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be place at risk of extinction.

An assessment of the potential for NSW threatened flora and fauna species occurring on-site or otherwise being impacted by the proposal was undertaken (refer Appendix B: NSW Threatened Species Likelihood of Occurrence Table). It was determined that the site is unlikely to support a population of, or habitat, for threatened species. No further consideration is necessary.

Part B - In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

- ***(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or***
- ***(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction***

The proposed activity would be undertaken in an area previously mapped (by SCC staff) as potentially comprising the endangered ecological community (ECC) *River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* (hereafter referred to as 'River-flat Eucalypt Forest'). Refer to Section 2.1 of this REF for details.

River Flat Eucalypt Forest is the name given to the ecological community associated with silts-clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. The structure of the community may vary from tall open forests to woodlands, although partial clearing may have reduced the canopy to scattered trees containing species listed in the NSW Scientific Committee's (as amended in 2011) Determination https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2011-2012/river-flat-eucalypt-forest-on-coastal-floodplains-minor-amendment-determination . Whilst the area of the proposed activity has species listed in the Determination and is within a coastal floodplain landform, the site is highly degraded dominated by exotic weed species (refer to Section 2.1 of this REF). This degradation was likely to have been exacerbated by the 2019/2020 bushfires and subsequent bushfires. Characteristic species that are present are in low abundance and most of the species listed in the Determination are absent.

The proposed activity may impact (excavator tracking over) approximately 2,880 m^2 of predominantly exotic weed vegetation. Impact to native species characteristic of the EEC would be minimal with a SCC Environmental Officer leading the tracking of the excavator to avoid occurrences of native tree and shrubs species as far as practicable.

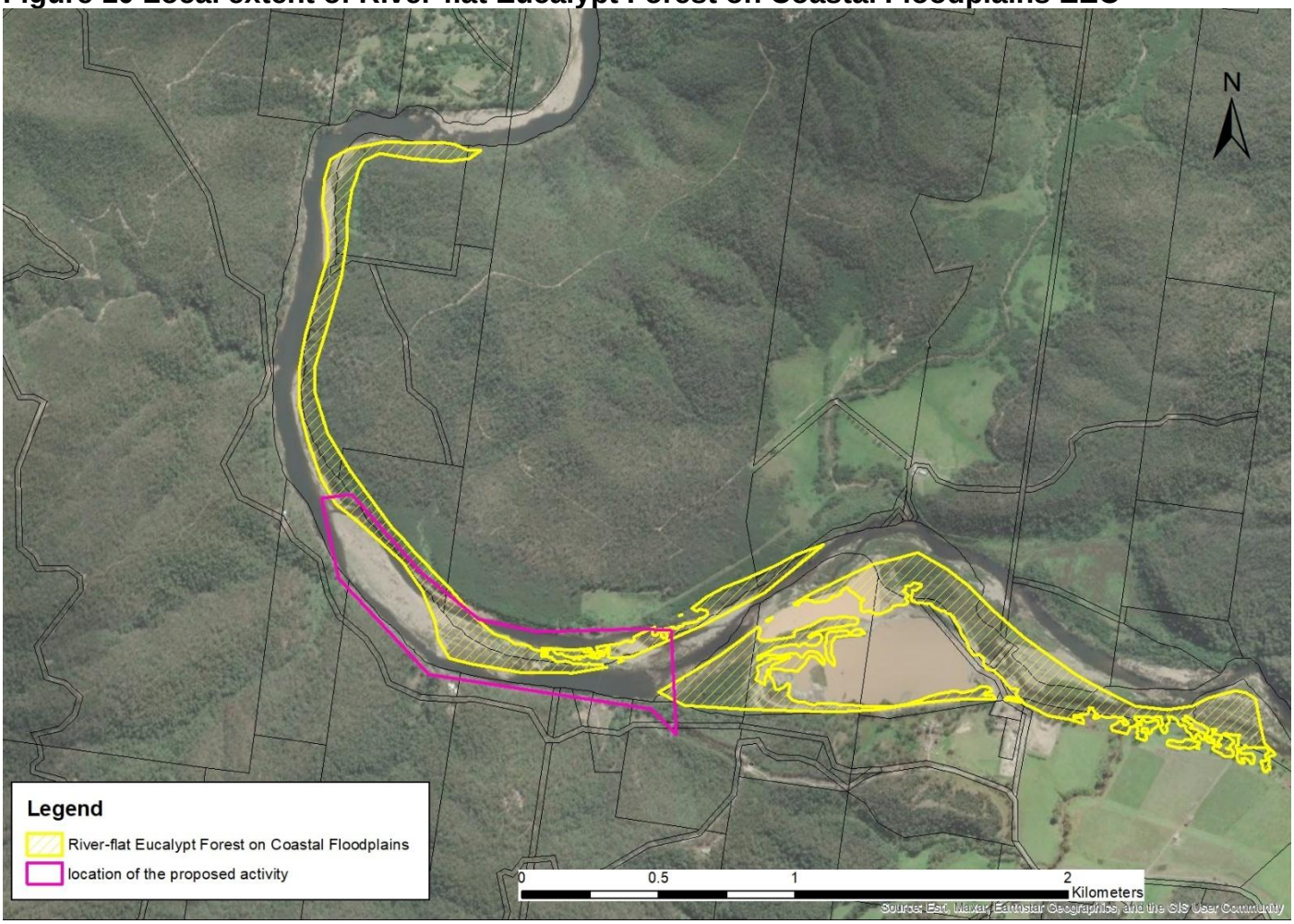
The local extent of the mapped EEC extends along the Shoalhaven River and is approximately 90 hectares in area (Figure 10 below). The probable vegetation impact would therefore be

insignificant in area (less than 0.1%) in comparison to the local extent of the EEC (Figure 10 below).

The proposal would not result in sediment movement, changes to soil characteristics or hydrology, nor the introduction of invasive species or edge effects that might impact indirectly on the EEC.

The proposal would therefore not involve a significant removal of the EEC and would not exacerbate the fragmentation or isolation, nor adversely affect the extent or composition of the EEC such that a local occurrence of the EEC would be placed at risk of extinction.

Figure 10 Local extent of River-flat Eucalypt Forest on Coastal Floodplains EEC



Part C - In relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.

No important habitat for threatened species would be removed or otherwise significantly impacted (see Part A).

No EEC would be fragmented or isolated, nor removed or modified to an extent that would affect the long-term survival of the EEC occurring in the locality (refer to Part B).

The proposal will therefore not affect the long-term survival of any threatened species or endangered ecological community in the locality.

Part D – Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No "*areas of outstanding biodiversity values"* have been declared in the City of Shoalhaven.

Part E – Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Key threatening processes listed in the NSW *Biodiversity Conservation Act 2016* considered relevant to the proposed activity include:

- Clearing native vegetation

Clearing of native vegetation is listed as a key threatening process, defined by the Scientific Committee's determination (OEH 2021) as:

> *the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of a stand or stands.*

Clearing of native vegetation has been shown to:

- cause widespread fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity;
- lead to soil and bank erosion, increased salinity and loss of productive land.

The impact of the proposal with regard to clearing of native vegetation, is not considered to be significant as it is unlikely to lead to:

- destruction of habitat causing a loss of biological diversity and extinction of species or loss or local genotypes.
- fragmentation of populations resulting in limited gene flow between small, isolated populations, reduced potential to adapt to environmental change and loss or severe modification of the interactions between species.
- riparian zone degradation such as bank erosion leading to sedimentation that affects aquatic communities – the riparian corridor would be stabilised as a result of the works.
- disturbance of habitat which may permit the establishment and spread of exotic species which may displace native species.
- loss of leaf litter, removing habitat for a wide variety of vertebrates and invertebrates.
- significant reduction of habitat for threatened species or ecological communities.

The proposed activity would not involve clearing of native vegetation, only disturbance through the tracking of an excavator. In this regard, the proposed activity may impact approximately 2,880 m^2 of predominantly exotic weed vegetation. Impact to native species characteristic would be minimal

with a SCC Environmental Officer leading the tracking of the excavator to avoid occurrences of native tree and shrubs species as far as practicable.

3.5 Indigenous heritage

Under Section 86 of the NSW *National Parks and Wildlife Act 1974* (NPW Act) it is an offence to disturb, damage, or destroy any Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP). The Act, however, provides that if a person who exercises 'due diligence' in determining that their actions will not harm Aboriginal objects has a defence against prosecution if they later unknowingly harm an object without an AHIP (Section 87(2) of the Act). To effect this, the NSW Department of Environment, Climate Change and Water have prepared the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wale*s (hereafter referred to as the 'Due Diligence Code') (DECCW 2010) to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for an AHIP.

A search on the Aboriginal Heritage Information Management System (AHIMS) on 9 April 2025 indicated that there are no recorded Aboriginal sites or places in the vicinity of the proposal (refer to AHIMS report below in Figure 11 below).

The site of the proposed activity is within a landscape feature listed in the Due Diligence Code that has a higher propensity for Aboriginal objects *i.e.* within 200 metres of waters. However, the area could also be described as 'disturbed land' as defined by the Due Diligence Code), i.e.:

> *Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable. Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as stormwater drainage and other similar infrastructure) and construction of earthworks."*

The proposed activity is within disturbed land as the lands have been subjected to the continued disturbance of human activity (weir) and natural disturbances, *i.e.* erosion and depositional forces of the Shoalhaven River.

An AHIP is not required, and the activity can proceed without an AHIP.

Figure 11 Results of AHIMS Aboriginal heritage search

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Burrier PS
Client Service ID : 994030

Shoalhaven City Council - Nowra
PO Box 42 Bridge Rd
Nowra New South Wales 2541
Attention: Geoffrey Young

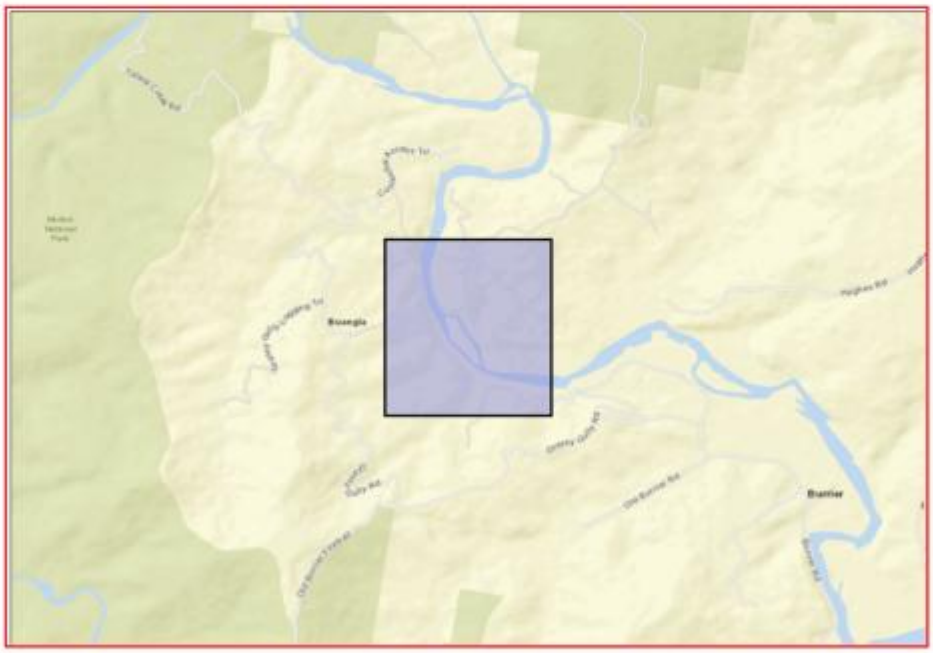
Date: 09 April 2025

Email: geoff.young@shoalhaven.nsw.gov.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 263716.0 - 265280.0, Northings : 6138723.0 - 6140407.0 with a Buffer of 0 meters, conducted by Geoffrey Young on 09 April 2025.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

3.6 Non-indigenous heritage

No items of local heritage significance or any items on the State Heritage Register or listed in the Shoalhaven Local Environmental Plan occur in close proximity to the site such that the proposed works might impact them.

3.7 Commonwealth *Environmental Protection and biodiversity Conservation Act 1999 assessment*

A Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Report was generated on 23 April 2025. An EPBC Protected Matters Report provides general guidance on matters of national significance and other matters protected by the

EPBC Act in the area selected. Of those threatened species and endangered ecological communities reported as likely occurring or having habitat within the area of the report, the following were considered to have potential habitat on the site and requiring of further assessment

- Australian Grayling *Proctotroctes maraena* (Vulnerable)

Refer also to Likelihood of Occurrence Table in Appendix B.

Additional species listed under the Act, including migratory birds, may occur occasionally and transiently within the vicinity of the proposed activity but would not be affected by the proposal.

A significant impact assessment of EPBC listed threatened entities was undertaken in Table 2 below.

Table 2: EPBC Significant Impact Assessment

Vulnerable species - Significant impact criteria Species to consider: • **Australian Grayling**	
Criteria	***Assessment***
lead to a long-term decrease in the size of an important population of a species	Although the species has historically been known to occur within the Shoalhaven River and the proposed activity is just upstream of the tidal prism, the proposed activity is unlikely to have an adverse effect on the life cycle of the species such that a viable local population of the species is to be placed at risk of extinction for the following reasons: • The species has not been recently detected in the Shoalhaven River and a 2024 eDNA survey did not detect the species in the river. A viable population may not be present. • Works would be undertaken outside the critical months of October through to February. • The training wall would not exceed the height of the adjacent shingle bar thereby allowing for passage of the species during high flow events. • The remediation of the weir would be conducted to allow for continued fish passage over the weir *i.e.:*1:20 grade on the repaired section of the weir and avoiding vertical drops greater than 100mm in height and concentrated areas of velocity. Refer to Section 3.4.1 of this REF for more information.
reduce the area of occupancy of an important population	No
fragment an existing important population into two or more populations	No
adversely affect habitat critical to the survival of a species	No important habitat for this species will be impacted by the proposed activity. No breeding habitat would be impacted. Refer to Section 3.4.1 for more information.
disrupt the breeding cycle of an important population	Works would not affect breeding habitat. Refer above and to Section 3.4.1 for more information.

modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Although the species has historically been known to occur within the Shoalhaven River and the proposed activity is just upstream of the tidal prism, the proposed activity is unlikely to have an adverse effect on the life cycle of the species such that a viable local population of the species is to be placed at risk of extinction for the following reasons: • The species has not been recently detected in the Shoalhaven River and a 2024 eDNA survey did not detect the species in the river. A viable population may not be present. • Works would be undertaken outside the critical months of October through to February. • The remediation of the weir would be conducted to allow for continued fish passage over the weir *i.e.:*1:20 grade on the repaired section of the weir and avoiding vertical drops greater than 100mm in height and concentrated areas of velocity. Refer to Section 3.4.1 of this REF for more information.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No invasive species will be introduced
introduce disease that may cause the species to decline	No disease will be introduced
interfere substantially with the recovery of the species	No

Conclusion of EPBC Significant Impact Assessment

The proposal is unlikely to have an adverse effect on a vulnerable, endangered, critically endangered or migratory species or its habitat, nor on the extent or integrity of an endangered ecological community such that its local occurrence is likely to be placed at risk of extinction.

No other matters of significance would be affected as a result of the proposed activity, i.e.:

- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- world heritage properties;
- national heritage places;
- the Great Barrier Reef Marine Park;
- nuclear actions; or
- a water resource, in relation to coal seam gas development and large coal mining development.

Further assessment and referral to the Commonwealth is therefore not required.

3.8 EP&A Regulation – Section 171 matters of consideration

Section 171(2) of the *Environmental Planning and Assessment Regulation 2021* lists the factors to be taken into account when consideration is being given to the likely impact of an activity on the

environment under Part 5 of the EP&A Act. The following assessment in Table 3 below deals with each of the factors in relation to the proposed activity.

Table 3: Section 171(2) Factors

Does the proposal:	Assessment	Reason
a) Have any environmental impact on a community?	Positive – long term	The proposed activity seeks to repair damage that, if not fixed, will continue to significantly impact Shoalhaven City Council's water supply. The proposed activity would not have any impact on community services and infrastructure such as power, waste water, stormwater, waste management, educational, medical or social services.
b) Cause any transformation of a locality?	Negligible	The locality would remain as Shoalhaven River, natural shingle bar and rock weir.
c) Have any environmental impact on the ecosystem of the locality?	Low adverse	An assessment provided in Section 3 of this REF concludes that the proposed activity would not have a significant impact upon threatened species or endangered ecological communities. No significant habitat features would be removed or otherwise impacted. No food resources critical to the survival of a particular species would be removed. Aquatic ecosystems are not likely to be significantly affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
d) Cause a diminution of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Low adverse / positive	In the context of the locality the visual impact of the activity would be minimal. The proposed activity would have minimal to impact on the aesthetic, recreational, scientific or other environmental qualities or values of the site.
e) Have any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, or social significance or	Negligible	The proposed activity would not affect a site listed on the State Heritage List or a site listed in the heritage schedules of the SLEP 2014 (refer to Section 3.6 of this REF). Underground 'relics' (as defined in the NSW Heritage Act) are also not anticipated. The site is not within an Aboriginal Place declared under the National Parks and Wildlife Act 1974. In accordance with the NSW Department of Environment, Climate Change and Water's Due Diligence Code of

Does the proposal:	Assessment	Reason
other special value for present or future generations?		Practice, the proposed activity does not require an Aboriginal Heritage Impact Permit as the activity is unlikely to harm an Aboriginal artefact (refer to Section 3.5 of this REF).
f) Have any impact on the habitat of protected fauna (within the meaning of the Biodiversity Conservation Act 2016)?	Low adverse	No protected fauna habitat will be removed by the activity. No important habitat will be removed or otherwise impacted. The potential impact is therefore considered to be insignificant or inconsequential. The proposed activity would not have a significant impact upon threatened fauna (refer to Section 3.4 of this REF). The specified environmental mitigation measures (Section 7) would mitigate indirect impacts to fauna and habitat.
g) Cause any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	Negligible	There are no species likely to rely on the site of the proposed works to the extent that modification would put them further in danger (refer to Section 3.4 of this REF). The prescribed environmental safeguards and mitigation measures (Section 7 of this REF) would minimise the risk of impact on resident fauna, fish, and flora.
h) Have any long-term effects on the environment?	Negligible	Works would be relatively short-term and the noise generated will occur during normal working hours. The proposed activity would not use hazardous substances or use or generate chemicals which may build up residues in the environment. The possible impacts have been discussed in detail under Section 3. Refer also to the conclusions and recommendations in Section 7.
i) Cause any degradation of the quality of the environment?	Low-adverse	Aquatic ecosystems are not likely to be significantly affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. The proposal would not intentionally introduce noxious weeds, vermin, or feral animals into the area or contaminate the soil. Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
j) Cause any risk to the safety of the environment?	Negligible	The proposed activity would not involve hazardous wastes and would not lead to increased bushfire or landslip risks. The activity is not anticipated to adversely affect flood behaviour or exacerbate flooding risks.
k) Cause any reduction in the	Positive	The site is critical to Shoalhaven's water supply. The proposed activity seeks to repair damage that, if not fixed,

Does the proposal:	Assessment	Reason
range of beneficial uses of the environment?		will continue to significantly impact Shoalhaven City Council's water supply. The site and local environment will remain relatively unchanged. The proposal is not anticipated to result in further degradation of the site or surrounding land.
l) Cause any pollution of the environment?	Low adverse	The proposal would involve a temporary and local increase in noise during the construction phase due to the use of machinery. However, this will not affect any sensitive receivers such as schools, childcare centres and hospitals. It is unlikely that the activity (including the environmental impact mitigation measures) would result in water or air pollution, spillages, dust, odours, vibration or radiation. The proposal does not involve the use, storage or transportation of hazardous substances or the generation of chemicals which may build up residues in the environment.
m) Have any environmental problems associated with the disposal of waste?	Negligible	The waste that would be disposed off-site can be recycled or re-used in accordance with resource recovery exemptions or taken to a licensed waste facility. There would be no trackable waste, hazardous waste, liquid waste, or restricted solid waste as described in the NSW *Protection of the Environment Operations Act 1997*.
n) Cause any increased demands on resources (natural or otherwise) which are, or are likely to become, in short supply?	Negligible	The amount of resources that would be used are not considered significant and would not increase demands on current resources such that they would become in short supply.
o) Have any cumulative environmental effect with other existing or likely future activities?	Negligible	The assessed low adverse or negligible impacts of the proposal are not likely to interact. Mitigation measures (Section 7) shall be implemented to minimise the risk of cumulative environmental effects. The current proposal would not significantly affect habitat connectivity or reduce any significant vegetation. No further construction activities are planned for this location.
p) Any impact on coastal processes and coastal hazards, including those under	Negligible	The proposed activity would have no effect on coastal processes including those projected under climate change conditions. The site of the proposed activity is not in a coastal hazard zone.

Does the proposal:	Assessment	Reason
projected climate change conditions		
q) applicable local strategic planning statements, regional strategic plans or district plans made under the Act, Division 3.1	Positive	The proposed activity is consistent with the *Shoalhaven 2040* Strategic Land-use Planning Statement, including Planning Priority 2 *Delivering infrastructure* https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D20/437277. The activity is not inconsistent with the Illawarra Shoalhaven Regional Plan 2041 https://www.planning.nsw.gov.au/-/media/Files/DPE/Plans-and-policies/Plans-for-your-area/Regional-plans/Illawarra-Shoalhaven-Regional-Plan-05-21.pdf and does not impact any areas mapped in the Planning Statement as “high environmental value” or “habitat corridor”.
r) other relevant environmental factors	n/a	Environmental factors have been addressed in Section 3 of this REF.

4. PERMISSIBILITY AND APPROVALS

4.1 NSW Environmental Planning & Assessment Act 1979

Section 4.1 (Development that does not need consent) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) states that:

> *"If an environmental planning instrument provides that specified development may be carried out without the need for development consent, a person may carry the development out, in accordance with the instrument, on land to which the provision applies."*

In this regard, Section 2.159(2A) of the NSW *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) states that "*Development for the purpose of the maintenance or replacement of existing water storage facility may be carried out by or on behalf of a public authority without consent on any land" (https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0732#sec.2.159).* As the proposed activity would be for the purposes of a water storage facility[1] by a public authority, *i.e.* SCC, Section 2.159(2A) of the T&I SEPP applies, and the proposed activity does not require development consent.

As the proposed activity does not require development consent, and as it constitutes an 'activity' for the purposes of Part 5 of the EP&A Act, being carried out by (or on behalf of) a public authority, environmental assessment under Part 5 of the EP&A Act is required. This REF provides this assessment.

4.2 NSW *Water Management Act 2000*

Under the *Water Management Act 2000*, all water that flows into an identified water source is allocated to consumptive and non-consumptive uses through water sharing plans. Apart from the management of water sources, the Act provides a system of licences and approvals for water access, use, and management works.

The Shoalhaven River at the site of the proposed activity is managed through the Greater Metropolitan Region Unregulated River Water Sources Water Sharing Plan 2023 (https://legislation.nsw.gov.au/file/2023-329%2020241004.pdf) and is within the Lower Shoalhaven River Catchment Water Source. Under this water sharing plan and Shoalhaven Water's local water utility licence, Shoalhaven Water can extract water from the river when flows are above 90ML/day. When the river flow drops below 90ML/day, Shoalhaven Water can request a release from Tallowa Dam (Water NSW) or release water from Danjera Dam.

The problem that the proposed activity seeks to address is that once flows drop below 160ML/day, the pondage around the pump station intakes drops to levels that Shoalhaven Water are unable to pump and refill the off-stream storage (Bamarang Dam) for treatment and distribution.

Shoalhaven Water has an access licence (WAL25350) and approval for water extraction at the proposed activity site (10CA102367) with a share component of 22,900ML. Subject to conditions, water may be taken at any time. The conditions, shown in Figure 12 below, do not pose restrictions or preclude the proposed activity.

[1] "water storage facility" as defined in the Standard Instrument is a "*dam, weir or reservoir for the collection and storage or water"*

Figure 12 Conditions of water access licence

- Conditions

Plan Conditions

Water sharing plan	Greater Metropolitan Region Unregulated River Water Sources 2023
	Take of water
MW8562-00001	The volume of water taken under this access licence during a period of 3 consecutive water years must not be more than the maximum water account debit permitted, which is the sum of the following: A. the water allocations credited to the water allocation account for this access licence from available water determinations made during those 3 water years, B. the amount of water allocations assigned to the water allocation account for this access licence, C. the water allocations recredited to the water allocation account for this access licence.
MW8563-00001	A. Water must not be taken under this access licence when there is no visible flow at the location from which water is taken. B. This restriction does not apply if water is taken from an in-river pool, off-river pool, in-river dam pool or a run-off harvesting dam.
MW8564-00001	Water must not be taken under this access licence from an: A. in-river pool that is below full capacity, B. off-river pool that is below full capacity, or C. in-river dam pool unless the take is not inconsistent with a water supply work approval authorising the use of a water supply work for the purpose of taking water from the in-river dam.
	Use of water
MA6945-00001	Water must only be used for town water supply purposes.
	Monitoring and recording
MW8583-00001	A. The access licence holder must record the following information in a logbook for each period of time that water is taken: i. date, volume of water taken, start and end time when water was taken, and ii. the access licence number under which the water is taken, and iii. the approval number of the water supply work used to take the water, and iv. the purposes for which water is taken. B. The access licence holder must record the following information in the logbook at the end of each water year: i. the volume of water taken in the water year, and ii. the maximum volume of water permitted to be taken in that water year. C. This requirement does not apply if water is taken through a water supply work that has both an operational: i. meter that complies with Australian Standard AS 4747 - Meters for non-urban water supply, and ii. data logger. D. This condition ceases to apply to this access licence on the day on which the mandatory metering equipment condition applies as specified in clause 230(1) in the Water Management (General) Regulation 2018.
MW6612-00001	A logbook used to record water take information must be retained for five (5) years from the last date recorded in the logbook.
MW8482-00002	A. Before water is taken under this access licence, the access licence holder must confirm that cease to take conditions do not apply and water may be taken. B. Where the access licence holder is required to keep a logbook, the access licence holder must record the confirmation, including the way in which the confirmation was established, in a logbook.
	Reporting
MW8582-00001	A. The access licence holder must give notice of run of river town water supply transfers planned for the following 24 hours. B. The notice must be published: i. on a website maintained by the holder of this access licence, and ii. no later than 9am each day.

Other Conditions

NIL

The Act also regulates activities that are likely to affect waterfront land or to interfere with an aquifer (s.91E(1)). Local councils, however, are exempt from this provision of the Act in relation to all controlled activities that they carry out in, on or under waterfront land by virtue of clause 41 of the *Water Management (General) Regulation 2018*.

4.3 NSW Crown Land Management Act 2016

Components of the proposed works within the Shoalhaven River would be undertaken on Crown Land *i.e.*

- installation of training wall
- extraction of materials for the training wall

- remediation of the weir, and
- conveyance of plant and machinery (*e.g.* excavator).

Under Section 9.2 of the *Crown Land Management Act 2016* a person must not "*erect a structure on Crown land"* or "*interfere with any substance on, in or forming part of Crown land"*. The proposed activity involves such activities.

Section 5.21 of the Act provides for licences to conduct activities and use of Crown land. A Crown land licence shall therefore be obtained prior to the commencement of works.

4.4 NSW Fisheries Management Act 1994

The Shoalhaven River is "Key Fish Habitat" for the purposes of the Act.

The proposed activity would comprise works regulated by the Act, namely, blocking of fish passage (Section 219 of the Act). "Blocking" includes obstructions across or within a river that could result in fish being blocked or left stranded or the free passage of fish be obstructed. A "Fisheries Permit" will therefore be required prior to any works.

NB: Section 200 of the Act (Circumstances in which a local government authority may carry out dredging or reclamation) would normally apply to the proposed activity (training wall and weir remediation). As the dredging and reclamation work, however, would be authorised under the Crown Land Management Act 2016 (refer to Section 4.3 of this REF) a Fisheries Permit for this component of works would not be required (s.200(2)(a)). Instead, Crown lands department would refer the Crown lands licence application to NSW Fisheries for comment prior to authorising the dredging and reclamation work proposed in the licence application.

4.5 NSW *Local Government Act 1993*

Section 59A(1) of the Act provides that Shoalhaven is the owner of all water supply works installed on land by the Council whether or not the land is owned by the Council. Section 59A(2) provides that a Council can operate, repair, replace, maintain and improve or do any things that are necessary or appropriate to any of its works to ensure that, in the opinion of the council, the works are used in an efficient manner for the purposes for which the works were installed. This is applicable to the proposed works to the weir but it is uncertain whether this provision prevails over Acts such as the *Crown Land Management Act 2016* and the *Fisheries Management Act 1994*.

4.6 Other

A summary of other relevant legislation and permissibility is provided in Table 4 below.

Table 4: Summary of other relevant legislation and permissibility

NSW STATE LEGISLATION
Environmental Planning and Assessment Act 1979 **(EP&A Act)**
Permissible √ Not permissible ☐
Justification: The T&I SEPP provides for the proposed works to be undertaken without development consent (refer above). In circumstances where development consent is not required, the environmental

assessment provisions outlined in Part 5 of the Act are required to be complied with. This REF fulfils this requirement.

State Environmental Planning Policy (Hazards and Resilience) 2021

Permissible √ Not permissible ☐

Justification:

The proposed activity is not mapped as comprising coastal wetlands or littoral rainforest for the purpose of this SEPP. Other considerations of the SEPP are not applicable to the proposed activity.

Protection of the Environment Operations Act 1997

Permissible √ Not permissible ☐

Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.

Local Land Services Act 2013

Permissible √ Not permissible ☐

Justification:

Any clearing of vegetation would be of a kind authorised under Section 60O(b)(ii) of the Local Land Services Act 2016 ("an activity carried out by a determining authority within the meaning of Part 5 of the Act after compliance with that Part."). No separate authorisation under the Act is required.

***National Parks and Wildlife Act 1974* (NP&W Act)**

Permissible √ Not permissible ☐

Justification:

- The proposed activity would not encroach into National Park estate.
- The Act provides the basis for the legal protection and management of Aboriginal sites in NSW. Under Sections 86 and 90 of the Act it is an offence to disturb an Aboriginal object or knowingly destroy or damage, or cause the destruction or damage to, an Aboriginal object or place, except in accordance with a permit of consent under section 87 and 90 of the Act.
- As there are no recorded sites or visible objects and as the site is on 'disturbed land' and not in a landscape that would have a higher propensity for heritage objects, the Due Diligence Guidelines (DECCW 2010) requires no further assessment as it is reasonable to conclude that there is a low probability of objects occurring in the area of the proposed activity and an AHIP is not required. Refer to Section 3.2 of this REF for more information.

Biodiversity Conservation Act 2016

Permissible √ Not permissible ☐

Justification:

- The proposed activity is unlikely to have a significant impact on species and communities listed in the schedules of the Act (refer to Section 3.4.2 of this REF).
- The proposed development is not within an area declared to be of "outstanding biodiversity value" as defined in the Act.
- The design and mitigation measures (Section 7) would ensure that no *serious and irreversible impacts on biodiversity values* (as defined by the BC Act) occur at the site of the proposed activity.

The proposed activity therefore is not deemed to be *likely to significantly affect threatened species* and an environmental impact statement (EIS) or a Biodiversity Development Assessment Report (BDAR) is not required.

It is also a defence to a prosecution for an offence under Part 2 of the Act (harming animals, picking plants, damaging the habitat of threatened species or ecological communities *etc*) if the work was essential for the carrying out of an activity by a determining authority within the meaning of Part 5 of the *Environmental Planning and Assessment Act 1979* after compliance with that Part. The activity will not remove vegetation that is listed under Schedule 1 Threatened Species, Schedule 2 Threatened ecological communities and Schedule 6 Protected Plants. Therefore the activity is considered permissible as this REF has been prepared and determined in accordance with the EP&A Act.

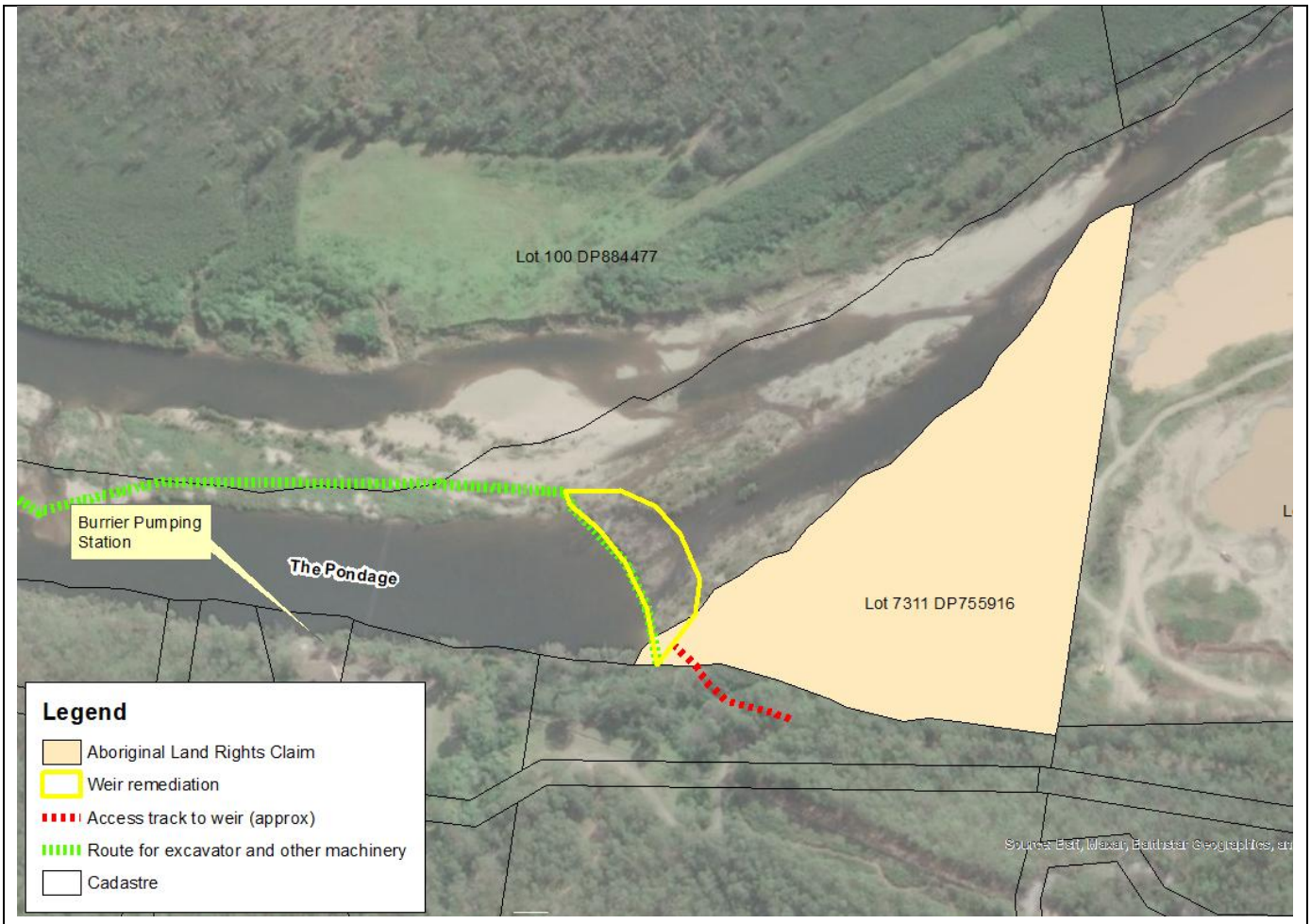
Aboriginal Land Rights Act 1983

Permissible √ Not permissible ☐

Justification:

Crown Reserve R755916 (Lot 7311 DP 1129118) is subject to the 2017 blanket and multiple Aboriginal Land Rights claim. The proposed activity can however proceed without further action or consultation with the claimants as the weir was in place in the 1960's long before the 2017 claim and the temporary use of the existing track through this property would not impact the assessment and outcome of the claim.

The Act also does not preclude the proposed activity.



COMMONWEALTH LEGISLATION

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EP&BC Act)

Permissible √ Not permissible ☐

Justification:

The proposed activity would not be undertaken on Commonwealth land and no matters of National Environmental Significance are likely to be significantly impacted by the proposed activity. The proposed activity is therefore not a controlled action and does not require Commonwealth referral. Refer also to Section 3.7 of this REF.

Commonwealth *Native Title Act 1993*

Permissible √ Not permissible ☐

Justification:

The proposed activity may impact Native Title. The appliable Future Act Option was considered to be provided by Subdivision K (Facilities for Services to the Public). Refer to SCC document reference D25/170339 - Native Title Future Act Assessment - Schedule C Worksheet - Burrier Pumping Station Pondage remediation). As a consequence a notice of intention was sent to

NTSCORP on 6 May 2025 (SCC reference D25/196283 - SENT - Referral Notice - Native Title Future Act - Remediation of Burrier Pumping Station Pondage - Shoalhaven River & Lot 7311 DP 1129118.) Once the notification period has lapsed (3 June 2025) the proposed activity can commence.

5. CONSULTATION WITH GOVERNMENT AGENCIES

5.1 Transport and Infrastructure SEPP 2021 requirements

Section 2.10 – Consultation with councils - development with impacts on council-related infrastructure or services

Regarding the consultation triggers in Section 2.10 of the SEPP, the proposed activity would:

(a) not have a substantial impact of stormwater management services

(b) unlikely generate traffic to an extent that it would strain the capacity of the road system

(c) not involve connection to, or have a substantial impact on the capacity of the sewerage system

(d) not involve connection to, and use of a substantial volume of water from the water supply system

(e) not involve the installation of a temporary structure on, or the enclosing of, a public place that is under Council's management that is likely to cause a disruption to pedestrian or vehicle traffic

(f) not involve the excavation of, or a footpath adjacent to, a road for which the proponent is not responsible for the maintenance of the road or footpath.

No consultation is therefore required.

Section 2.11 – Consultation with councils - development with impacts on local heritage

There would be no heritage objects or places affected by the proposed activity (refer to Section 3.6 of this REF for more information).

Section 2.12 – Consultation with councils - development with impacts on flood liable land

Although undertaken on flood liable land, the proposed activity would not change flood patterns other than a minor extent. Consultation is therefore not required.

Section 2.13 – Consultation with State Emergency Service (SES) - development with impacts on flood liable land

Although undertaken on flood liable land, the proposed activity is not a "relevant provision" as prescribed in Section 2.13(2). Consultation is therefore not required.

Section 2.14 – Consultation with councils - development with impacts on certain land within the coastal zone

The proposal would not occur within a coastal vulnerability area. Consultation is therefore not required.

Section 2.15 – Consultation with public authorities other than councils

The proposed activity would comprise a fixed structure in navigable waters. In accordance with Section 2.15(c) a 'notice of intention' was sent to the NSW Maritime branch of Transport for NSW

(TfNSW) on 8 April 2025 (SCC reference D25/166118). A response was received on 17 April 2025 (D25/166112). The response stated the following:

> *"I can confirm that the NSW Maritime branch of Transport for NSW have no objections or other requirements in relation to these works.*
>
> *Once the works are complete, Maritime will conduct an assessment of the completed fixed structure and advise whether it will need to be marked in any way, to ensure it does not cause a danger to navigation. If marking is required, this is normally achieved via the placement of aids to navigation such as floating aqua buoys.*
>
> *Given the known vessel operating profile, the narrow and shallow nature of the waterway at this location and the fact that it is within an existing 4 knot speed restricted zone, I don't anticipate anything will be required, however, pursuant to section 23(1) on the Marine Safety Regulation 2016 , if control measures are deemed appropriate, the owner of the obstruction to navigation will be responsible for installing and maintaining them."*

TfNSW shall be notified upon completion of the works to allow the Maritime branch to conduct the assessment.

In consideration of the other consultation requirements specified under Section 2.15 of the Transport and Infrastructure SEPP, the proposed activity:

- would not be undertaken adjacent to land reserved under the *National Parks and Wildlife Act 1974* or land acquired under that Act
- would not be undertaken on land in Zone E1 National Parks and Nature Reserves on in an equivalent land use zone.
- would not increase the amount of artificial light in the night sky and located on land within the dark sky region as identified on the dark sky region map
- would not be undertaken within Defence communications facility buffer (only relevant to the defence communications facility near Morundah)
- would not be undertaken on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*
- would not have an impact on the Willandra Lakes Region World Heritage Property
- would not occur in a Western City operational area specified in the *Western Parkland City Authority Act 2018.*

These prescribed consultation requirements therefore do not apply.

Section 2.16 – Consideration of Planning for Bush Fire Protection (PBP)

The proposed activity would not be undertaken on Bushfire Prone Land and is not a development prescribed in this section (health services facilities, correctional centres, residential accommodation). Consideration of PBP is therefore not required.

5.2 NSW Department of Primary Industries and Regional Development (DoPIRD)– Fisheries

In response to a request for Environmental Assessment requirements and multiple notices about the proposed activity, a response from DoPIRD Fisheries was received on 25 March 2025 (SCC document reference D25/151357). The response states:

> ***"Environmental Assessment Requirements:*** *In addition to the general environmental assessment requirements in s.3.3.1 of the Policy and Guidelines for Fish Habitat Conservation and Management (the Policy), the REF for this proposal will need to address the following:*
>
> - *Provide a clear justification for all aspects of the works.*
> - *Show that the works are aligned with the conditions of Shoalhaven Water's Water Access License for this site.*
> - *Provide a clear description of the proposed design and staging of the works and methods of construction.*
> - *With the proposed work on the weir breaches, which have been verbally described to us as loosely placing some of the large displaced boulders within the breached areas to slow the flow of water, please indicate the grade at which the rock will be placed, the overall height of the rock to be added to the weir, and the grade on the downstream side of the weir. Ideally these rocks should be placed to avoid a vertical drop in the waterflow on the downstream side and be placed at a 1:20 grade.*
> - *An assessment of impacts of the works design and construction on aquatic habitats and fish passage. This should include consideration of cumulative impacts and new impacts (e.g. potential breaching of the shingle bar in another location).*
> - *An assessment of significance for Fisheries Management (FM) Act threatened species mapped as having an expected distribution in the area (e.g. Australian grayling).*
> - *A description of the proposed mitigation measures to reduce environmental impacts on the environment.*
>
> ***Fish passage requirements:*** *DPIRD Fisheries has determined that given the works on the weir are essentially some form of maintenance, rather than construction, alteration or modification of the weir, s.218 of the FM Act will not be activated in this instance, and s.219 of the FM Act will also not apply. If works increase in scale, this advice will be reviewed and may change.*
> *While s.218 of the FM Act will not apply, DPIRD Fisheries recommends the repair works on the weir breached be designed to avoid or minimise impacts on fish passage. In this case, likely caused from vertical barriers greater than 100mm in height, steep grades and velocity barriers (through concentration of flows). This would continue to support fish passage through the weir during low flows events, and support fish populations and recreational fishing, which is popular in the area, whilst providing an essential water source for the Shoalhaven community. Some suggestions as to how this can be achieved is to repair only one of the breaches (if possible), create a 1:20 grade on the repaired section and avoid creating or enhancing vertical drops or concentrated areas of velocity.*
> *This recommendation aligns with s.4.3.1 of The Policy which support the following management principle:*
>
> - *Where retained, owners shall be encouraged to undertake structural changes to reduce the impact of weirs on the environment.*

Australian grayling data:

- *Last year, DPIRD Fisheries undertook some eDNA sampling for Australian grayling across its range. Results from this sampling are available here: Australian Grayling | Department of Primary Industries*
- *Further information on Australian grayling is available from: Australian Grayling*

Approvals: *A formal notification process under s.199 of the Fisheries Management (FM) Act will be required prior to any authorisation of these works by another agency, e.g. Crown Lands or DCCEEW Water. If both agencies determine the works do not trigger any authorisation requirements under their relevant legislation, then a permit to dredge and reclaim under the FM Act will be required. "*

In response:

- a justification for the works is provided in Section 1 of this REF
- water access licence conditions do not preclude the proposed the activity (refer to Section 4.2)
- rock for the weir breaches shall be placed at a 1:20 grade and a height of similar to the 1994 surveyed heights (Figure 5 p.13)
- an assessment of the impact on aquatic habitat and fish passage is provide in Section 3 of this REF
- an assessment of impact on the Australian Grayling is provided in Section 3.4.1 of this REF
- environmental impact mitigation measures and safeguards for the proposed activity are provided in Section 7 of this REF.
- Repair work to the weir would be designed to minimise impacts on fish passage by (refer to Section 7 of this REF):
    - allowing water flow over the weir in low flow conditions
    - creating a 1:20 grade on the repaired sections and avoiding vertical drops or concentrated areas of velocity

Further consultation will occur through the process of obtaining Fisheries Permit.

6. COMMUNITY ENGAGEMENT

The proposed activity would be considered “Local Area / Low Impact” under SCC’s Community Engagement Policy (POL/28). The only community engagement necessary is to obtain the consent of landowners to access the weir and shingle bar (refer to Section 7 of this REF).

7. ENVIRONMENTAL SAFEGUARDS AND MEASURES TO MINIMISE IMPACTS

Note that safeguards / measures are prescribed unless otherwise stated.

Safeguard / Measure	Responsibility
Works planning, approvals, consultation and notification	
1. This REF shall be published on the NSW Planning Portal.	SCC Environmental Operations Officer
2. Crown Land Licence shall be obtained for works within the river.	Shoalhaven Water Project Manager and SCC Environmental Operations Officer
3. A Fisheries Permit for the blockage / obstruction of fish passage shall be obtained.	Shoalhaven Water Project Manager and SCC Environmental Operations Officer
4. The timing of works shall occur outside the months of September to March, which are the key months of native fish to spawn or recruit.	Shoalhaven Water Project Manager
5. Land owners consent shall be obtained to enter private lands to undertake the activity (Table 1 p.7)	Shoalhaven Water Project Manager
Works	
6. The timing of works shall coincide with low flow periods. This can be assisted by restricting flow from Tallowa and Danjera Dams.	Shoalhaven Water Project Manager
7. Works shall be compliant with the conditions of the Fisheries Permit and the Crown Lands Licence	Shoalhaven Water Project Manager Contractor / operator
8. The rock bag layers shall be embellished with tree logs that project in towards the southern channel to catch debris, sediments and shingles/cobbles. These logs shall be sourced from the shingle bar. Only logs from dead trees which are not currently embedded in the substrate are to be used for this purpose.	Shoalhaven Water Project Manager Contractor / operator
9. The rock bags shall utilise shingles extracted nearby but away from the shoreline (*i.e*. in the middle of the shingle bar). A minimum 10m buffer to the water for both excavation and filling of rock-bags shall be applied. The rock bag layer shall be positioned approximately 1 metre offset from the existing shingle bar shoreline, inside the northern channel to facilitate natural build-up of material along the shoreline.	Shoalhaven Water Project Manager Contractor / operator

Safeguard / Measure	Responsibility
10. The height of the northern training wall shall match the height of the adjacent shingle bar and thereby allowing water passage during higher flows and avoid breaches elsewhere.	Shoalhaven Water Project Manager Contractor / operator
11. A SCC Environmental Officer shall guide the route of the excavator to the site of the training wall.	Shoalhaven Water Project Manager Contractor / operator SCC Environmental
12. The weir remediation shall be undertaken after the training wall installation.	Shoalhaven Water Project Manager
13. The height of the weir shall not exceed the height of the training wall and not exceed pre-breach levels. The heights shown in Figure 5 (p.13) should be utilised.	Shoalhaven Water Project Manager
14. The remediation of the weir shall be conducted as per requirements of DoPI – Fisheries staff *i.e.* 1:20 grade on the repaired section of the weir and avoiding vertical drops greater than 100 mm in height and concentrated area of velocity.	Shoalhaven Water Project Manager, SCC Environmental Officer, Contractor/operator
15. Vegetation impact shall be undertaken only to the extent required to carry out the works.	Contractor / operator
16. An emergency spill kit shall be always kept on-site with procedures to contain and collect any leakage or spillage of fuels, oils, greases, *etc* .	Contractor / operator
17. No major equipment maintenance works shall be undertaken on-site.	Contractor / operator
18. To avoid the risk of pollution from machinery, refuelling shall generally be done off site, however if refuelling on site is required, due care shall be taken to avoid spilling fuel and a tray shall be used to catch any accidentally spilt fuel.	Contractor / operator
19. Any woody debris extant outside the works area shall be left in-situ.	Contractor / operator
Post construction	
20. An asset form must be trimmed to file 44574E on commissioning of the assets in Accordance with POL15/8 Asset Accounting Policy section 3.1.4 and POL16/79 Asset Management Policy section 3.3.	Shoalhaven Water Project Manager
21. TfNSW – Maritime shall be notified to allow the agency to conduct safety assessment.	Shoalhaven Water Project Manager

Safeguard / Measure	Responsibility
22. Any post-construction conditions of the Fisheries Permit shall be accomplished.	Shoalhaven Water Project Manager SCC Environmental Operations Officer

8. SIGNIFICANCE EVALUATION & DECISION STATEMENT

This Review of Environmental Factors has assessed the likely environmental impacts, in the context of Part 5 of the *Environmental Planning and Assessment Act 1979*, of a proposal by Shoalhaven City Council for the replacement of the remediation of the Burrier Pumping Station Pondage on the Shoalhaven River, Burrier and Illaroo.

In consideration of the proposal as described in Section 1, and assuming the implementation of all proposed safeguards and mitigation measures (Section 7), it is determined that:

1. It is unlikely that there will be any significant environmental impact as a result of the proposed work and an Environmental Impact Statement is not required for the proposed works.
2. The proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats and a Species Impact Statement / BDAR is not required.
3. A Crown Land Licence and a Fisheries Permit shall be obtained prior to the commencement of works. No additional statutory approvals, licences, permits and external government consultations are required.
4. The proposed activity may proceed.

In accepting and adopting this REF, Shoalhaven City Council commits to ensuring the implementation of the proposed safeguards and mitigation measures identified in this report (Section 7) to minimise and/or prevent detrimental environmental impacts.

Determined by:

Matthew Kidd
(Acting) Director – Shoalhaven Water
Shoalhaven City Council Date: 8/5/2025

9. REFERENCES

Backhouse, G., Jackson, J. and O'Connor, J. 2008a. *National Recovery Plan for the Australian Grayling Prototroctes maraena*. Department of Sustainability and Environment, Melbourne. https://www.dcceew.gov.au/sites/default/files/documents/australian-grayling.pdf

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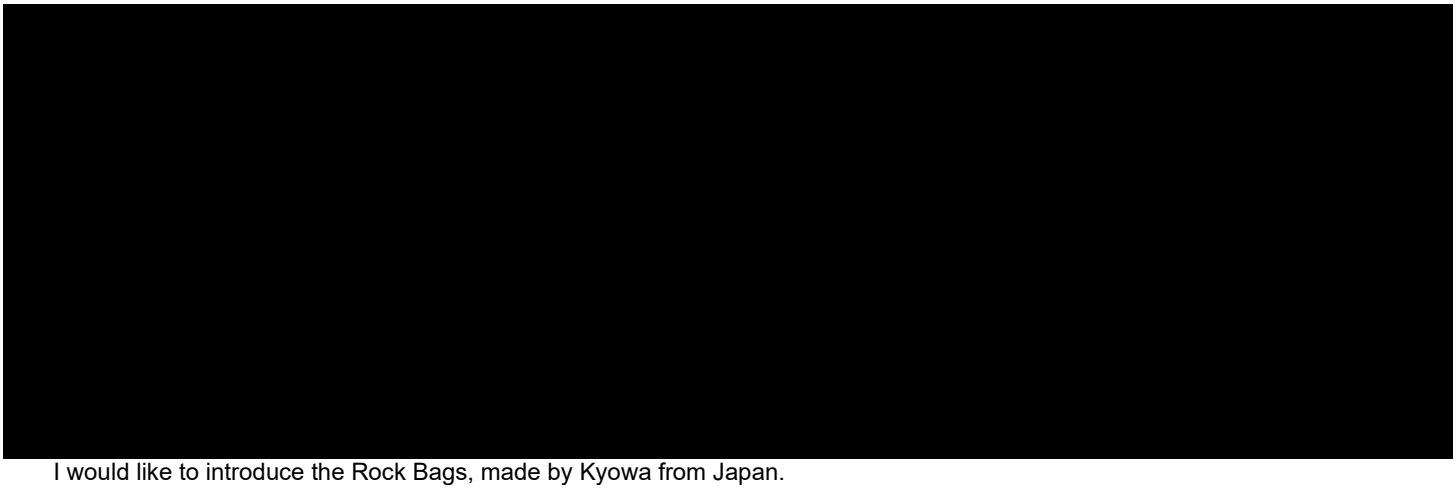
APPENDIX A – ECOGREEN ROCK BAGS

Rock Bags | Barriers & Gabion Alternative Erosion Solutions



I would like to introduce the Rock Bags, made by Kyowa from Japan.
Rock bags are a simple solution used to prevent scour and erosion on bridges, pylons, beaches, culverts, riverbanks, submarine cables an
creeks and at road and rail embankments.

Engineer Design Brief:

- 2t velocity flow up to 4.7 m/s: 1900mm diameter x 400mm high.
- 4t velocity flow up to 5.3 m/s: 2400mm diameter x 600mm high.
- Quickly and easily removable for pylon inspections or temporary uses.
- HR Wallingford tested.
- WRL Manly tested.

Project Management Brief:

- 5 minutes to fill a bag using 1x excavator and 2x labourers.
- 5 – 10 minutes to deploy a bag.
- Most projects need little to no foundation preparation work, deploy onto site as is.
- Removable, replaceable, temporary, permanent.

















MADE WITH
100% RECYCLED MATERIALS

Bluemont Rock Bags

Quick facts:

- Made from 100% recycled material.
- Rock Bags, first used in 1987 at the Akashi-Kaikyo Bridge in Japan.
- Quick and easy deployment with no foundation work required prior to installation for most sites.
- More than 1.3 million rock bags installed in over 24,000+ projects since 1987, 35 years ago.
- Tested in Australian facilities. Used in Australia & New Zealand since 2016.
- Durable and long-lasting, they last 50 years+ in water and have up to 30 years' protection against UV rays.
- Supports marine life, sustainable and eco-friendly.

ANZ project examples:

- Beaches: Wamberal Beach, Collaroy Beach, Stockton Beach, Bonnie Vale
- Bridges & Roads: Coondoo Bridge, Kholo Bridge, Kingsford Smith Drive, Brisbane, Gilbert River Bridge
- Offshore: Great Barrier Reef
- Ports: Lyttelton Port, upgrade for ULCV, Onlsow, Port Kembla, Devonport
- Rail: Sandy Creek Muswellbrook, Chilcott's Creek Kankool, Narrabri Creek Narrabri, Goulburn River Widden.

Geoff, we'll send you short and simple project updates once a month. The updates focus on project example solutions, more photos than w
Please contact me with any questions.
Kind Regards,
Mark de Guia

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Australia, New Zealand, PNG, Pacific Islands

Many thanks for your enquiry on the Kyowa rock bags, it is appreciated.
I wanted to reach out to see if there's anything we can assist you with regarding a particular project you might be working on. With over 1,000 installations across Australia and New Zealand, we've gathered a wealth of knowledge and experience that we'd be happy to share.
If there's any information or insights we can provide, please don't hesitate to let us know. We're always here to help!
Looking forward to hearing from you.
The rock bags were first used in 1987, so have been successfully protecting against erosion for over 35 years.
The lifespan of the rock bags is 50 years.

Advantages of using Rock Bags:

- 100% recycled materials.
- Over 1.3 million rock bags installed since 1987.
- Tested in Australian facilities for projects across ANZ.

1 tonne Eco-Green rock bag:

- Empty bag weighs 4.4kg.
- Filled bag weighs approximately 1t.
- 120 bags per pallet.
- 5 bags per bundle, 24x bundles per pallet.
- Lifting rings supplied with each bag, the lifting rings deploy with the bags permanently.
- Rock Details:
    a. Rock fill required is 0.65m³ per rock bag.
    b. Rock size 50mm to 150mm (can be up to 175mm but 150mm is preferable).
    c. Rock is best when it has a round / sphere shape rather than flat.
    d. Rock does not need to be rumbled or smoothed.
    e. Gravity of rock to be at least 2.6.
- Size when deployed is approximately 1500mm diameter by 350mm high.
- Area of each bag is 1.77m².
- Velocity Design Details:
    Flow up to 4.2 m/s (grouped), includes safety margin.

2 tonne Eco-green rock bag:

- Empty bag weighs 6kg.
- Filled bag weighs approximately 2t.
- 100 bags per pallet.

- 4 bags per bundle, 25x bundles per pallet.
- Lifting rings supplied with each bag, the lifting rings deploy with the bags permanently.
- Rock Details:
    a. Rock fill required is 1.3m³ per rock bag.
    b. Rock size 50mm to 150mm (can be up to 175mm but 150mm is preferable).
    c. Rock is best when it has a round / sphere shape rather than flat.
    d. Rock does not need to be rumbled or smoothed.
    e. Gravity of rock to be at least 2.6.
- Size when deployed is approximately 1900mm diameter by 400mm high.
- Area of each bag is 2.84m².
- Velocity Design Details:
    Flow up to 4.7 m/s (grouped), includes safety margin.

For most inland project, the 2t rock bag is most commonly used.
The 1t bag is only a little smaller, and the 4t has a higher flow velocity capability.
The 8t bag is primarily used in offshore applications.
The 2t can be used with most medium sized excavators.

4 tonne Eco-Green rock bag:

- Empty bag weighs 13kg.
- Filled bag weighs approximately 4t.
- 50 bags per pallet.
- 2 bags per bundle, 25x bundles per pallet.
- Lifting rings supplied with each bag, the lifting rings deploy with the bags permanently.
- Rock Details:
    - Rock fill required is 2.7m³ per rock bag.
    - Rock size 50mm to 150mm (can be up to 175mm but 150mm is preferable).
    - Rock is best when it has a round / sphere shape rather than flat.
    - Rock does not need to be rumbled or smoothed.
    - Gravity of rock to be at least 2.6.
- Size when deployed is approximately 2400mm diameter by 600mm high.
- Area of each bag is 4.53m².
- Velocity Design Details:
    - Flow up to 5.3 m/s (grouped), includes safety margin.

4 tonne 2W rock bag:

- Empty bag weighs 13kg.
- Filled bag weighs approximately 4t.
- 40 bags per pallet.
- 2 bags per bundle, 20x bundles per pallet.
- Lifting rings supplied with each bag, the lifting rings deploy with the bags permanently.
- Rock Details:
    - Rock fill required is 2.5m³ per rock bag.
    - Rock size 50mm to 150mm (can be up to 175mm but 150mm is preferable).
    - Rock is best when it has a round / sphere shape rather than flat.
    - Rock does not need to be rumbled or smoothed.
    - Gravity of rock to be at least 2.6.
- Size when deployed is approximately 2400mm diameter by 600mm high.
- Area of each bag is 4.53m².
- Velocity Design Details:
    - Flow up to 5.3 m/s (grouped), includes safety margin.

8t 2W Type rock bag:

- Empty bag weighs 45kg.
- Filled bag weighs approximately 8t.
- 15 bags per pallet.
- Lifting rings supplied with each bag, the lifting rings deploy with the bags permanently.
- Rock Details:
    - Rock fill required is 5.0m³ per rock bag.

    - Rock size 75mm to 200mm.
    - Rock is best when it has a round / sphere shape rather than flat.
    - Rock does not need to be rumbled or smoothed.
    - Gravity of rock to be at least 2.6.
- Size when deployed is approximately 3000mm diameter by 700mm high.
- Area of each bag is 7.07m².
- Velocity Design Details:
    - Flow up to 5.8 m/s (grouped), includes safety margin.

Short Video Explanations:

- Filling (34 seconds in length) - https://youtu.be/HkNM5L8GBKM (throat tying at 18 seconds is important)
- Filling Frame (18 seconds) – smooth edges explained https://youtu.be/k6w3f6N8ToE
- Deployment (47 seconds in length) - https://youtu.be/gMHF7DeTnlM or https://youtu.be/BHeazgw_7pc
- Swansea – recent, local and easily observed marine growth example - https://www.bluemont.com.au/erosion/kyowa-rock-filter-bags/videos/

Projects and Case Studies:

a. Australian / New Zealand project summaries, refer Project Summaries.
b. A few beach projects in Japan where the rock bags are visible via google maps / earth (longitude / latitude).
   Ichikawa (35.667361, 139.938327).
   Kansai Airport (34.443776, 135.248122).
   Sagami (35.176159, 139.138737).
   Oarai (36.324459, 140.593275).
   Hamana Beach (34.680246, 137.557404).
   Haneda Airport (35.555807, 139.796267).

Estimating calculation numbers:

- The following is based on feedback from clients in local projects.
- Bluemont supplies the rock bags and lifting rings.
- Filling and placing by others.
- Cost rock bag: $..... x ……. bags = $.....
- Cost of rock: $……. per m³ / tonne x ……. tonne = $…….
- Filling frame: Estimate for a locally made frame once off: $1,000 (refer attached for specifications).
- Estimated labour & machines:
- Filling time per rock bag: 5 – 10 minutes, refer below video links.
  Hourly rate of approximately 10 bags per hour to fill.
  1x operator / machine and 2x labourers.
- Deployment time: placing per machine, limited manual labour or lifting.
  Hourly rate of approximately 10 bags per hour to deploy.
  1x operator / machine and 2x labourers.

The below is the summary o□the important parts to filling and tying o□the Rock Bags.
These simple yet important steps go towards ensuring an efficient work flow and damage □ree bags, to support a success□ul deployment.

Filling Frame:

Filling frames MUST be smooth, with NO protrusions or sharp corners.



In short, plate steel works well as it is a smooth surface with no protrusions. If you have to make the filling frames by adapting materials, then bolts, lifting points etc must be smoothed off, counter sunk, etc.

For a 2t filling frame we have used 8mm steel.

If using older plate steel that may be a bit rusty, it would be good to run a smoothing grinder over the surface to remove any rough rusted spots that may just grab rather than slide.

This video shows how much the bags slide up the external sides of the filling frame during filling, which is why there are to be no protrusions.

https://youtu.be/k6w3f6N8ToE

Burs and rough edges – ensure you have access to a grinder in case the top edge of the filling frame becomes burred, if large enough these could catch / tear a bag.

The frequency and severity of any burs depends on the rock used and the number of bags filled in the project.

Have a grinder available to smooth off if required.

Filling:

Do NOT over fill the filling frame (nor under fill).

The ideal fill is level with the top of the filling frame to all edges.

In reality, the rock will slightly heap in the middle and gap in the corners, which is okay to estimate the 'level' equivalent of the frame being full.

Lifting Ring, Pre-Lift Tying the Throat Rope:

Tying of the throat rope well and correctly is VERY important.

This video shows the critical task of tying off the throat rope well.

https://youtu.be/hQMvsXZ899w

Connect the lifting ring with the 6x lifting points – ie red tape tabs.

Operator to lift the bag just enough to remove the slack from around and under the bags.

Be careful, do NOT lift the bag more than required.

If you lift the bag too far, rocks will want to spill over the edges of the filling frame, and when the bag settles back into the frame this can be a pinch point, which can damage the bag.

Once the slack lift has happened, lower the rock bag so the ground person can tie the throat rope correctly.

The net should not be wide, so the throat rope can be pulled tight and tied off well.

Stockpiling:

- The bags can be stacked for stockpiling.

Notes:

- Rates are ex GST.
- Valid for 30 days.
- Rates are ex Freight / Delivery.
- Please review rates used machines, labour and rock for local rates.
- Filling frame to be manufactured locally by client, refer attached for design details.
- Bluemont are suppliers only and not engineers. Please seek professional advice regarding project estimates, suitability and design.

Please contact me with any questions.

Kind Regards

Rowan Hodges

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Australia, New Zealand, PNG, Pacific Islands

APPENDIX B – NSW THREATENED SPECIES LIKELIHOOD OF OCCURRENCE TABLE

The table of likelihood of occurrence (below) evaluates the likelihood of threatened species to occur on the subject site. This list is derived from previously recorded species within a 5 km radius (taken from Office of Environment and Heritage (OEH) Wildlife Atlas) around the subject site (search undertaken on 13 April 2025). Ecology information has been obtained from the Threatened Species Profiles on the NSW OEH website (www.threatenedspecies.environment.nsw.gov.au).

Likelihood of occurrence in study area

1. Unlikely – Species, population or ecological community is not likely to occur. Lack of previous recent (<25 years) records and suitable potential habitat limited or not available in the study area.
2. Likely – Species, population or ecological community could occur and study area is likely to provide suitable habitat. Previous records in the locality and/or suitable potential habitat in the study area.
3. Present – Species, population or ecological community was recorded during the field investigations.

Possibility of impact

1. Unlikely – The proposal would be unlikely to impact this species or its habitats. No EP&A Act 5-Part Test or EPBC Act significance assessment is necessary for this species.
2. Likely – The proposal could impact this species, population or ecological community or its habitats. An EP&A Act 5-Part Test and/or EPBC Act significance assessment is required for this species, population or ecological community.

Endangered Ecological Community name	***Status***	***Likelihood of presence within areas impacted by the activity***
Bangalay Sand Forest of the Sydney Basin and South East Corner Bioregions	Endangered - *NSW* BC *Act*	Does not occur on-site and is not mapped as occurring in close proximity to the site
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	Endangered - *NSW* BC *Act* Vulnerable - Commonwealth *EPBC Act*	Does not occur on-site and is not mapped as occurring in close proximity to the site
Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - *NSW* BC *Act*	Does not occur on-site and is not mapped as occurring in close proximity to the site.
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion	Endangered - *NSW* BC *Act* Critically Endangered - Commonwealth *EPBC Act*	Does not occur on-site and is not mapped as occurring in close proximity to the site.

Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Does not occur on-site and is not mapped as occurring in close proximity to the site.
River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions	Endangered – NSW BC Act Critically Endangered - Commonwealth EPBC Act	Mapped as occurring at the site. Further assessment undertaken in Section 3.4.2 of this REF.
Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - *NSW* BC *Act* Endangered - Commonwealth *EPBC Act*	Does not occur on-site and is not mapped as occurring in close proximity to the site.
Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - NSW BC Act	Does not occur on-site and is not mapped as occurring in close proximity to the site.

Species name	***Status***	***Habitat requirements (www.environment.nsw.gov.au)***	***Likelihood of presence within areas impacted by the activity***
FLORA			
Hibbertia sticta subsp furcalata	Endangered NSW BC Act	The species is known to occur in two populations, one in the outskirts of Sydney and one in the vicinity of Nowra. Habitat is poorly recorded but appears to be dry sclerophyll forest or woodland associations in sandy soils over sandstone.	No – no habitat present. Conspicuous species not observed on site.

Square Raspwort *Haloragis exalata subsp. exalata*	Vulnerable NSW BC Act Vulnerable EPBC Act	The species occurs in 4 widely scattered localities in eastern NS. It is disjunctly distributed in the Central Coast, South Coast and North Western Slopes botanical subdivision of NSW. The species appears to require protected and shaded situations in riparian habitats.	No – no habitat present. Conspicuous species not observed on site.
Ettrema Mallee *Eucalyptus sturgissiana*	Vulnerable NSW BC Act	The Ettrema Mallee is mostly restricted to the Northern Budawang Range in Morton National Park, with a few occurrences on the nearby coastal plain. Usually grows as an emergent in low shrub-heath. Grows on sandy, swampy soils.	No – no habitat present. Conspicuous species not observed on site.
Scrub Turpentine *Rhodamnia rubescens*	Critically Endangered *NSW* BC *Act*	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	No – no habitat present. Conspicuous species not observed on site.
Nowra Heath Myrtle *Triplarina nowraensis*	Endangered NSW BC Act Endangered EPBC Act	There are only five known populations of the species. Three of these form a cluster to the immediate west of Nowra. A fourth, much smaller population is found 18 km south-west of Nowra in the Boolijong Creek Valley. The fifth population is located north of Shoalhaven River on the plateau above Bundanon. It occurs on poorly drained, gently sloping sandstone shelves or along creek lines underlain by Nowra Sandstone. The sites are often either treeless or have a very open tree canopy due to the impeded drainage.	No – no habitat present. Conspicuous species not observed on site.
Cotoneaster Pomaderris *Pomaderris cotoneaster*	Endangered NSW BC Act Endangered EPBC Act	The species has been recorded in a range of habitats in predominantly forested country. The habitats include forest with deep friable soil, amongst rock and beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs	No – no habitat present. Conspicuous species not observed on site.
Solanum celatum	Endangered NSW BC Act	The species grows in rainforest clearings, or in wet sclerophyll forests.	No – no habitat present. Conspicuous species not observed on site.

AMPHIBIANS			
Stuttering Frog *Mixophyes balbus*	Endangered NSW BC Act Vulnerable EPBC Act	The species is found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor.	No - No habitat will be removed or otherwise affected.
Giant Burrowing Frog *Heleioporus australiacus*	Vulnerable BC Act Vulnerable EPBC Act	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Breeding habitat is generally soaks or pools within first or second order streams. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites.	No - No habitat will be removed or otherwise affected.
REPTILES			
Rosenberg's Goanna *Varanus rosenbergi*	Vulnerable NSW BC Act	The species is found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in. Shelters in hollow logs, rock crevices and in burrows, which they may dig for themselves, or they may use other species' burrows, such as rabbit warrens	No - No habitat will be removed or otherwise affected.
Broad-headed Snake *Hoplocephalus bungaroides*	Endangered NSW BC Act Endangered EPBC Act	The species is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups within the coast and ranges. Nocturnal. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in crevices or hollows in large trees within 500m of escarpments in summer.	No - No habitat will be removed or otherwise affected.
BIRDS			
White-bellied Sea-Eagle *Haliaeetus leucogaster*	Vulnerable BC Act	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent	Observed at the site and would occur transiently within the site. Highly mobile species. However no important habitat will be removed or otherwise affected.

		eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.	
Gang-gang Cockatoo *Callocephalon fimbriatum*	Vulnerable NSW BC Act	Tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. preferring more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. Favours old growth attributes for nesting and roosting	Possibly occurring transiently within the site. Highly mobile species. However, no important habitat will be removed or otherwise affected.
South-eastern Glossy Black-Cockatoo *Calyptorhynchus lathami lathami*	Vulnerable BC Act Vulnerable EPBC Act	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, *Allocasuarina diminuta*, and *A. gymnathera.* Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (Casuarina cristata). Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding the cones with the massive bill.	Possibly occurring transiently over or within the site. Highly mobile species. No important habitat will be removed or otherwise affected. No sign of feeding from Sheoaks in the vicinity of the proposed activity.
Little Lorikeet *Glossopsitta pusilla*	Vulnerable NSW BC ACT	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species	Possibly occurring transiently within the site. Highly mobile species. No important habitat will be removed or otherwise affected.

		Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina	
Powerful Owl *Ninox strenua*	Vulnerable NSW BC Act	Coastal Woodland, Dry Sclerophyll Forest, wet sclerophyll forest and rainforest- Can occur in fragmented landscapes Roosts in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda,* Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species. requires old growth elements-hollow bearing tree resources for nesting and prey resource. Nests in large tree hollows in large eucalypts that are at least 150yrs old. Often in riparian areas. Large home range	Possibly occurring transiently over or within the site outside of construction hours. Highly mobile species. No important habitat will be removed or otherwise affected.
Masked Owl – *Tyto novaehollandiae*	Vulnerable *NSW* BC *Act*	Dry eucalypt forests and woodlands from sea level to 1100 m. Inhabits forest but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Requires old growth elements-hollow bearing tree resources for nesting and prey source.	Possibly occurring transiently over or within the site outside of construction hours. Highly mobile species. No important habitat will be removed or otherwise affected.
Sooty Owl *Tyto tenebricosa*	Vulnerable *NSW* BC *Act*	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests	Possibly occurring transiently over or within the site outside of construction hours. Highly mobile species. No important habitat will be removed or otherwise affected.

Regent Honeyeater *Anthochaera Phrygia*	Endangered BC Act Critically Endangered EPBC Act	The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast.	Possibly occurring transiently within the site. Highly mobile species. No important habitat will be removed or otherwise affected.
Varied Sittella *Daphoenositta chrysoptera*	Vulnerable *NSW* BC *Act*	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
Dusky Woodswallow *Artamus cyanopterus cyanopterus*	Vulnerable *NSW* BC *Act*	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	Possibly occurring transiently within the site. Highly mobile species. No important habitat will be removed or otherwise affected.
MAMMALS			
Spotted-tailed Quoll *Dasyurus maculatus*	Endangered *EPBC Act* Vulnerable *NSW* BC *Act*	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.

		recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares. Are known to traverse their home ranges along densely vegetated creeklines.	
Koala *Phascolarctos cinereus*	Vulnerable NSW BC Act	Eucalypt woodland and forest Home range sizes vary with quality of habitat ranging from less than two ha to several hundred ha. Preferred tree species on the south coast are *Eucalyptus amplifolia, E. viminalis, & E .tereticornis* but numerous other species also known food trees.	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
Southern Greater Glider *Petauroides Volans*	Vulnerable EPBC Act	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Occupy a relatively small home range with an average size of 1 to 3 ha. Give birth to a single young in late autumn or early winter which remains in the pouch for approximately 4 months and is independent at 9 months of age. Usually solitary, though mated pairs and offspring will share a den during the breeding season and until the young are independent. Can glide up to a horizontal distance of 100m including changes of direction of as much as 90 degrees. Very loyal to their territory.	Unlikely to occur. No important habitat will be removed or otherwise affected.
Brush-tailed Rock-wallaby *Petrogale penicillata*	Endangered NSW BC Act Vulnerable EPBC Act	The species occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north.	Unlikely to occur. No important habitat will be removed or otherwise affected.
Grey-headed Flying-fox *Pteropus poliocephalus*	Vulnerable *EPBC Act* Vulnerable *NSW* BC *Act*	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Possibly occurring transiently over or within the site. Highly mobile species. No important habitat will be removed or otherwise affected.

Eastern Coastal Freetail-Bat *Micronomus norfolkensis*	*Vulnerable NSW* BC *Act*	Small tree hollows/fissures in bark for roosting in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.
Southern Myotis (Large-footed Myotis) *Myotis macropus*	Vulnerable *NSW* BC *Act*	This species is predominantly roosts in caves, however, is known to roost in trees and man- made structures close to water. Roosts are generally located close to water, where the bats forage in small groups of three or four. They have a strong association with streams and permanent waterways in areas that are vegetated rather than cleared (Churchill, S 2008, Australian Bats, Jacana Books, Crows Nest, NSW They feed on small fish, prawns and aquatic macroinvertebrates. They have a preference towards large still pools, rather than flowing streams. They will also forage an aerial insects flying over water. They use their large feet to capture prey items (Churchill 2008).	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.
Greater Broad-nosed Bat *Scoteanaux ruepelli*	Vulnerable *NSW* BC *Act*	Found mainly in gullies and river systems that drain the Great Dividing Range, it utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, below 500m, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.